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# THE IRON TRADE REVIEW

**A Weekly Journal Devoted to the Machinery, Metal-Working and Foundry Trades, and Iron and Steel Manufacture.**

VOLUME XXXVII . CLEVELAND, OHIO, OCTOBER 20, 1904 NUMBER 42

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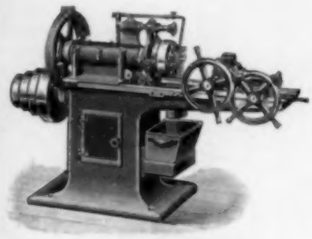

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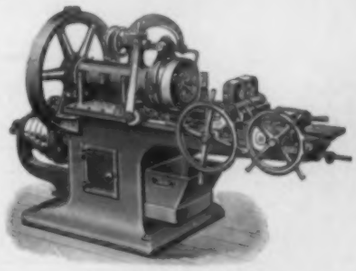

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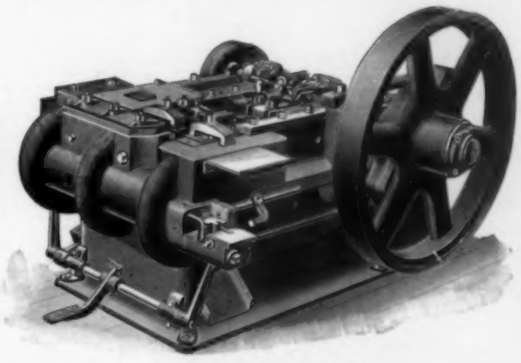

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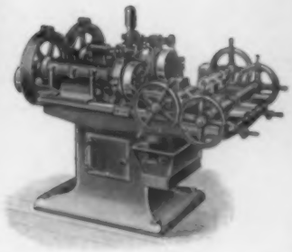

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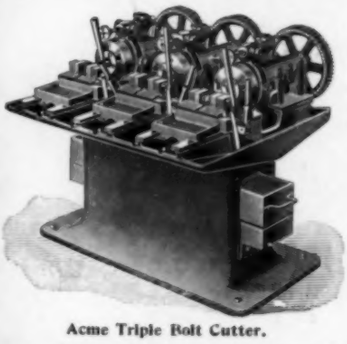

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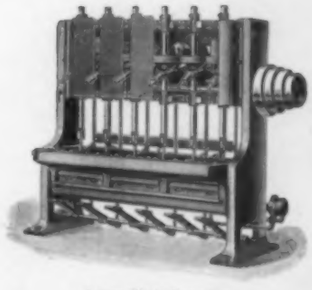

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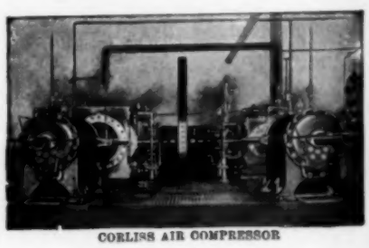

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# THE IRON TRADE REVIEW

VOLUME XXXVII CLEVELAND, OHIO, OCTOBER 20, 1904 NUMBER 42

## THE WEEK IN IRON CIRCLES.

### THE MARKET AT LARGE.

The increased activity in the iron market that set in with October has kept up and in pig iron the past week has seen the highest prices of the year. Consumption has been overlapping production for several weeks and while melters of pig iron bought in the market, particularly foundries, find no marked increase of orders, they are steadily melting more iron than in the summer months. The statistics indicate that pig iron output on Oct. 1 was at a rate of about 16,500,000 tons a year, while in March, April and May, the spring "freshet" carried it up to a rate of 18,000,000 tons. Pig iron production is now on its second upturn for the year, and the extent of the movement depends on several factors. One is the uncertainty of the coal strike in the South. Should it end soon, a considerable increase in output of Southern iron could be made before the end of the year. Another factor is the amount of idle capacity that will come in as prices rise. The advance has not been enough yet for the blowing in of furnaces that have been waiting for a real profit. But the important fact is that merchant stocks of pig iron were reduced 75,000 tons last month, with coke and anthracite production 185,000 tons more than in August.

There are no indications of a boom, though exaggerated improvement reports always in evidence at such a time are coming out. A feature both in pig iron and finished material lines is the widely distributed character of the buying, added to the fact that the material is almost entirely for early use in the shops of the buyers. Doubtless the improvement in the iron trade has now reached the point, also, at which the real iron market and the advancing Wall Street market are acting and reacting upon each other.

It would seem that too much has been made of the marking up of Southern iron to $10.50 for No. 2 foundry and to $11 by some producers. With little or no iron selling at these prices they are scarcely more significant than was the $12 price named in early 1902 by oversold producers who had no iron to sell at any price. Northern foundry irons have advanced, however, in the past week on actual sales, and the minimum for No. 2 foundry is now $12 at Central Western furnaces, while sales have been made at $12.25—an advance of 25 to 50 cents in a fortnight. Bessemer iron has sold at $12.25 at furnace and $12.50 is now asked. Good sales of Bessemer, foundry and forge have been made in the Pittsburg district and of foundry iron in all Northern markets at advancing prices. The report that the United States Steel Corporation is figuring on large purchases of Bessemer iron from merchant furnaces is doubted, both in view of its inactive furnace capacity and the recent declarations of officers of the corporation that it would not need to be a buyer of iron for a long time. If the purchases should be made for the purpose of sustaining the market and swelling the wave of improvement, they would of course produce an effect, but its permanency would be open to question and the risk of reaction would be no small factor. The large steel interest at Buffalo is reported in the market for 40,000 tons of Bessemer iron, which would naturally be supplied by Buffalo producers.

The coke market is temporarily affected by short water supply in the Connellsville region, causing the putting out of nearly a thousand ovens. For 1905 sellers are now asking $1.75 at ovens for furnace coke.

Considerable activity is noted in steel billets and sheet bars and consumers have sought to contract for the early months of next year. In spite of slight concessions by independent interests large steel works have held to association prices. The steel rail situation is a waiting one. Manufacturers cite the well maintained freight rates of the carriers as an important element in the problem of rail prices for next year. While $24 is a commonly discussed price, conditions in the next few weeks may fix $26 or even $28 as the basis. The rail requirements for next year are expected to be considerably beyond the buying for 1904. Standard sections are inactive today, though light rail business is good.

Heavy melting scrap is higher and steel works are withdrawing as sellers—a fact significant of much increased steel works operation.

While there are no conspicuous orders in finished material, the aggregate booked by several large steel companies was again greater for the past week than shipments from mills. Plate and structural mills are feeling the effect of the recent contracts for cars and lake vessels and for new construction work. Steel car works are reported to have close to 20,000 cars under contract and there has been a marked increase in new orders for wooden cars. Bars do not figure in the new business of the week in the same proportion as other materials, though bar specifications are good. In wrought pipe an advance of about $2 a ton has been made. Shafting manufacturers met in Cleveland last week and reaffirmed prices.

### PITTSBURG.

(Special Telegram.)

PITTSBURG, Oct. 19.—No confirmation can be had of the report that the Steel Corporation will buy Bessemer iron. It is well understood that the corporation is quite prepared to supply all its steel works requirements. The Lackawanna Steel Co. will probably buy Bessemer iron at Buffalo. Arrangements with nearby furnaces are such that hot metal can be transferred from the furnaces to the Lackawanna steel plant.

Low water has resulted in closing nearly 1,000 ovens in the Connellsville region. Unless there is more water within a week, a large number of additional ovens will be compelled to go out. For furnace coke for the first half of next year, operators today are asking $1.75.

It is believed here that a number of independent furnaces

may be short of ore before May 1, 1905. Merchant ore firms, it is understood, are bringing down only such ore as is sold.

Heavy melting stock is stronger. An offer of $12.75 for 1,000 tons has been turned down. Large steel interests are holding for $13.

Atlantic furnace of the Republic Iron & Steel Co., New Castle, Pa., resumes Nov. 1. Mary furnace at Lowellville, O., is also preparing to blow in.

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OFFICE OF *The Iron Trade Review*,
429 PARK BUILDING, Oct. 19.

All grades of pig iron advanced sharply during the week. The influences at work were heavy buying with bright prospects of a still greater buying movement in the next few days, the Southern iron situation, and the idleness of so many merchant stacks in the Mahoning and Shenango Valleys which are in no condition to blow in for some time owing to the repairs they are undergoing. Today few of the furnaces are willing to make any quotations on Bessemer, although $12.50 at the furnace is the minimum price at which it can be bought. Sales of close to 30,000 tons of Bessemer, foundry, basic and forge iron have been made in the last few days, and the inquiries that are out for Bessemer iron make the furnace operators hesitate about naming a price. The Lackawanna Steel Co. is in the market for Bessemer for delivery to the end of the year and will purchase 40,000 tons provided it can be secured at a reasonable figure. This tonnage was offered one operator at $12 and was promptly turned down.

It is reported that the United States Steel Corporation is considering the purchase of a large amount of Bessemer iron, rumors putting the tonnage at 200,000 tons and upward. The corporation has idle furnaces and furnaces never yet started, but it is stated that the purpose of the purchase would be to clean up all the available Bessemer iron that would be offered in the open market until July next year, and that the benefit to the Corporation would come in the higher prices that could be obtained for steel products. The report is received with some doubt. It was further reported that six of the Corporation blast furnaces were blown out during the week, but this is denied, only two having gone off, one at Edgar Thomson and one at Lucy for repairs. Only a small tonnage of Bessemer, foundry and forge iron is available for delivery until the end of the year, the furnaces in the Valleys that are operating being all pretty well sold up, while the idle stacks are all undergoing repairs and the date of their operation is very uncertain.

The strength of the Southern market has of course had a bearing on the local situation. No. 2 foundry is now quoted at $11, Birmingham, for delivery until the end of the year, and there are only a few stacks that have any iron to sell during this period. Eight small furnaces in that district have notified their local agents that they are out of the market entirely until January, while the three leading interests declare that they will only consider offers for delivery during the first quarter of 1905. Pig iron production in the South is of course curtailed on account of the coal miners' strike, and if no terms are made between employers and strikers there is little likelihood of more than a gradual increase in coal production in the next few months. Out of a total of 19 merchant furnaces in the Mahoning and Shenango Valleys and contiguous territory nine are idle, and of this number seven are undergoing repairs and are being reconstructed. One of these seven stacks will probably blow in early in November. The idleness of the other two stacks is no doubt due to the low prices that have been prevailing, and it will take a still further advance to bring them into the situation as factors. Of the furnaces in operation, one will continue making Bessemer iron for the Republic Iron & Steel Co. until the end of the year, two are producing basic on contracts that practically take care of the entire output for almost three months, two are making iron for tunnel castings, while the remainder are shipping close to 7,000 tons a month on the Pittsburg Steel Co. conversion contract. Very little foundry iron is being produced in this district for the open market, and the two Western Pennsylvania stacks in operation are both well sold up. There is little doubt that the market would quickly respond to any heavy purchase of Bessemer iron on the part of the United States Steel Corporation, as all conditions are favorable to further advances. The gradual resumption of idle stacks has to be considered, but the increase in production would be gradual.

This week an advance of one point on all sizes of pipe was announced amounting to $2 per ton. This announcement was rather unexpected at this season of the year, but as pipe prices have been exceedingly low, and as skelp has grown much firmer in the last two weeks the advance is not without reason. Plate mills report an increase in tonnage, specifications from steel car works increasing after the heavy buying on the part of the railroads in the past six weeks. It is estimated that the four leading steel car works have contracts on their books for fully 20,000 cars, the two local works having four months' work ahead. Specifications on steel bars continue good from the agricultural implement manufacturers, though there is no heavy new buying at present.

**Pig Iron.**—Sales of close to 30,000 tons of pig iron were made in this market during the week, one independent steel interest having picked up 15,000 tons of basic for delivery through the first quarter of next year at prices ranging from $11.75 to $12. These low prices, however, cannot be duplicated this week as the minimum on this grade for future delivery is $12.50 at the furnace. The sales of forge iron to iron mills aggregate 10,000 tons at prices ranging from $12.15 to $12.25, Pittsburg. We also note sales of nearly 4,000 tons of No. 2 foundry for delivery the first quarter of next year at $13.35, Pittsburg. The sale of 2,000 tons of Bessemer at $12.25, furnace, is also reported for delivery to the end of the year, but the minimum on this grade at present is $12.50, with conditions favorable to a still further advance. The inquiry of the Lackawanna Steel Co. for 40,000 tons of Bessemer is still in the market. This company has experienced considerable difficulty with its coke, and for that reason is short of iron at present. It has been intimated that if $12 at the furnace could not be done a much smaller tonnage would be purchased. Southern No. 2 is now held firmly at $11, Birmingham, although there were a few small sales during the past week at $10.50. The Southern operators are extremely sanguine over the outlook, the curtailed production in that section giving stronger prices. We revise quotations as follows:

| | |
|---|---|
| Bessemer, Valley | $12 25 to 12 50 |
| Bessemer, Pittsburg | 13 10 to 13 35 |
| No. 1 Foundry | 13 35 to 13 50 |
| No. 2 Foundry | 13 10 to 13 35 |
| Gray forge, Pittsburg | 12 15 to 12 25 |
| Chilled basic, Valley | 12 25 to 12 50 |
| Chilled basic, Pittsburg | 13 10 to 13 35 |

**Steel.**—Inquiries for steel are more numerous and a number of sales have been made at association figures. Independent mills are shading these prices somewhat. We make the following quotations: Bessemer and open-hearth billets, 4 x 4 in., and slabs, up to and including 0.25 carbon, $19.50, f. o. b. mill, Pittsburg, with actual freight added to point of delivery; 0.26 and including 0.60 carbon, $1 advance; 0.61 to 1.00 carbon, $2 advance. Billets smaller than 4 x 4 in., $2 advance; sheet and tin bars, $2 advance. Bessemer and open-hearth rods are held at $25 to $25.50.

**Ferro-Manganese.**—The market is weak and large lots can be had on the basis of $40, Pittsburg. Carload lots are held on a basis of $41 per ton, delivered at buyer's mill at any point east of the Mississippi.

**Muck Bar.**—The advance in forge iron has resulted in better prices for muck iron, which is held nominally at $24.50 to $25, Pittsburg.

**Skelp.**—The market continues strong, with grooved steel at 1.25c and sheared at 1.30c to 1.35c. Grooved iron is held at 1.40c and sheared at 1.45c to 1.50c.

**Rails and Track Material.**—A meeting of the rail association will be held next month, and while it is pre-

dicted that the price will be established for next year at $24, the trend of the market the next few weeks will have much to do with the new price. If the market continues to strengthen it would not be surprising if the present price were reaffirmed. We quote as follows: Standard sections, 50 pounds and over, in lots of 500 tons and over, $28; car lots and less than 500 tons, $30; less than car lots, $32; light rails, 16 to 40 pounds, $20 to $21. Spikes, 1.55c to 1.60c.

**Plates.**—Demand for plates is improving, the steel car interests specifying heavily. It is estimated that the Pressed Steel Car Co., American Car & Foundry Co., Standard Steel Car Co., and the Cambria Steel Co. have orders on their books for 20,000 steel cars. During the week the Erie Railroad has purchased 2,000 cars and the Panama Canal Commission has placed a contract with the Pressed Steel Car Co. and the Cambria Steel Co. for 1,000 steel dump cars. The Jones & Laughlin Steel Co. has also secured a contract for 6,000 tons of plates to be used in the construction of an elevator in Chicago. We make the following quotations: Tank plate, ¼ in. thick, 6¼ to 24 in., inclusive, 1.30c f. o. b. mill, Pittsburg; over 24 in. up to 100 in., 1.40c. Extras are as follows per pound: Flange and boiler steel, 10c; marine, A. B. M. A., and ordinary fire box, 20c; still bottom, 30c; locomotive fire box, 50c; plates over 100 in. up to 110 in. in width, not less than 5c per 100 lb. extra; plates 110 in. to 115 in. wide, not less than 10c extra; 115 to 120 in., 15c extra; plates 120 in. to 125 in. wide, not less than 25c extra; plates 125 in. to 130 in., not less than 50c extra; plates 130 in. wide, not less than $1 extra; plates 3-16 in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Five cents extra for less than carloads. Terms net cash in 30 days, and for all points of delivery in the United States except the Pacific Coast.

**Bars.**—Agricultural implement manufacturers continue to give local mills good specifications for steel bars. With a large crop the implement manufacturers expect a good year and the outlook for the bar mills during the winter months is bright. We quote as follows: Bar iron, 1.25c to 1.30c, Pittsburg; hoops, 1.55c, and bands, 1.35c, both taking bar extras. Bessemer and open-hearth steel bars, 1.30c; plow and cultivator beams, 1.30c, net; channels, angles, zees and tees, under 3 in., 1.40c; the following differentials are maintained on steel: Less than 2,000 lbs. of a size and not less than 1,000 lbs., 10 cents advance; less than 1,000 lbs. of a size, 30 cents advance.

**Pipes and Tubes.**—All kinds of pipe have been advanced one point this week, amounting to $2 per ton. The advance at this season of the year was unexpected, but the advancing skelp market due to the increase in the price of raw material has made this slight advance necessary. Discounts to consumers, carload lots, f. o. b. Pittsburg, plus freight to destination according to Tube Rate book, are revised as follows:

MERCHANT PIPE.

| | Steel. | | Iron. | |
|---|---|---|---|---|
| | Black. | Galv. | Black. | Galv. |
| ⅛ and ¼ inch | 70 | 54 | 68 | 52 |
| ⅜ and ½ inch | 74 | 62 | 72 | 60 |
| ¾ to 6 inches | 78 | 68 | 76½ | 66½ |
| 7 to 12 inches | 73 | 58 | 71½ | 56 |
| Extra Strong Plain Ends. | | | | |
| ⅛ to ⅜ inch | 63 | 51 | 61 | 49 |
| ½ to 4 inches | 70 | 58 | 68 | 56 |
| 4½ to 8 inches | 66 | 54 | 64 | 52 |
| Double extra strong plain ends, ½ to 8 inches | 59 | 48 | 57 | 46 |

MERCHANT BOILER TUBES, LESS CARLOADS, 22 FEET AND UNDER.

| | Steel. | Iron. |
|---|---|---|
| 1 to 1½ inch | 48 | 43 |
| 1¾ to 2¼ inches | 60 | 43 |
| 2½ inches | 62 | 48 |
| 2¾ to 5 inches | 68 | 55 |
| 6 to 13 inches | 60 | 43 |

**Sheets.**—Sheets continue firm at 2.10c for 28 gauge, and the demand is improving. Despite the recent reduction in sheet bars, sheet manufacturers refuse to shade this price on the most desirable specifications, and a slight advance in the near future is looked for. We make the following quotations: No. 8, 1.60c; No. 9, 1.65c; Nos. 12 to 14, 1.70c; Nos. 15-17, 1.75c to 1.80c; Nos. 18-21, 1.85c to 1.90c; Nos. 22-24, 1.95c; Nos. 25-26, 2c; No. 27, 2.05c; No. 28, 2.10c to 2.15c; No. 29, 2.35c to 2.40c; No. 30, 2.50c to 2.55c. Galvanized: Nos. 12-17, 2.20c to 2.25c; Nos. 18-21, 2.35c to 2.40c; Nos. 22-24, 2.50c to 2.55c; Nos. 25-26, 2.65c to 2.70c; No. 27, 2.90c; No. 28, 3.10c; No. 29, 3.45c to 3.50c; No. 30, 3.85c to 3.90c.

**Wire and Wire Nails.**—Demand continues good, but is still below the normal for this season of the year. The heavy buying movement is nearly over, although mills are busy filling contracts that have been placed. Locally prices are being strictly maintained, although shading in the West continues. We make the following quotations: Wire nails, jobbers' carload lots, $1.60; retailers' carloads, $1.65, and less than carloads, $1.75; painted barb wire, $1.75 to jobbers in carloads; retailers carloads, $1.80, and less than carloads, $1.90, with 30 cents for galvanizing. Annealed smooth fence wire is held at $1.45, with the usual differentials to retailers for carloads and less than carloads. Quotations are all f. o. b. Pittsburg, 60 days, with 2 percent discount for cash in ten days. Iron and steel cut nails are held at $1.65 to $1.70.

**Merchant Steel.**—A better demand for merchant steel is reported by local mills, although the shafting market continues quiet. We make the following quotations: Toe calk, 1.90c; carriage spring steel, 1.75c; tire steel, 1.50c to 1.55c; plow steel, 6 in. and under, 1.35c for Bessemer and open-hearth; plow slabs, ¼ in. and heavier, 1.60c. Drawn and cold rolled shafting is held at 52 percent off in carload lots and 47 off in less than carload lots.

**Old Material.**—In sympathy with the advance in pig iron, slight advances have been made in scrap, but sales continue small. Stocks in the yards of dealers and the leading railroads continue heavy, and until these are worked off, no great advance can be made on the various grades of old material. Steel works are no longer sellers of melting stock and low phosphorus material. We revise quotations, gross tons, as follows: Heavy melting stock, $12 to $12.50; low phosphorus, $15 to $15.50; rerolling rails, $12 to $12.50; sheet scrap, $10 to $10.50; No. 1 cast, $10.50 to $11; No. 1 wrought, $12 to $12.50, and cast iron borings $7 to $7.25.

**Coke.**—A number of furnace interests are already inquiring for prices on coke for the first half of next year. In view of the advances in pig metal the operators are not anxious to quote, although $1.50 and $1.60 has been named by different operators. Low water has already interfered with coking operations at a number of plants in the Connellsville region, and it is probable that a number of plants will be compelled to shut down completely unless the supply improves. For prompt shipment foundry coke is held at $1.75 to $1.85 at the ovens, although few operators are willing to consider this price for shipment during the first half of next year. During the week ending Oct. 8, the output of the upper region amounted to 218,000 tons, while the lower region produced 62,078 tons. In the two regions less than 6,000 ovens are idle.

**Structural Material.**—Little new business has been placed in structural shapes, although local mills are well filled until nearly the first of the year. So far as new work is concerned no great amount is in sight, and the manufacturers do not look for any decided improvement until after the first of the year. Quotations are as follows: Beams and channels, up to 15 in., 1.40c; over 15 in., 1.50c; angles, 3 x 2 up to 6 x 6, 1.40c; zees, 1.40c; tees, 1.45c; angles, from 3 to 16 in., 1.40c; universal and sheared plates, 6¼ to 24 in. inclusive, 1.30c; over 24 in., 1.40c base.

## CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Oct. 18.

In all its branches the local market maintains the firmness which has characterized it since the opening of October. New business has been of small proportions during the week, the only large order being a sale of 5,000 tons of axle billets to a local forging plant. Interest in this market centers in the pig iron situation. Southern iron is now quoted from $10 to $10.50 Birmingham for No. 2

foundry, with strong leanings towards the latter figure. At these prices, it is difficult to find a furnace willing to consider a proposition either for this year's or next year's delivery. With the exception of a few isolated stacks, nearly every producer in the South is either sold up or has withdrawn from the market, and foundrymen are forced to look to Northern furnaces for the supply of pressing needs. These furnaces advanced their prices from 25 cents to 50 cents a ton, and $13.75 is the minimum at which local No. 2 can now be bought.

Activity in finished iron and steel is confined largely to specifications against old contracts. These have been of such volume as to denote a general improvement in the subsidiary metal trades, plates, bars, tubes and structural material being called for in larger quantities. The most gratifying feature of the week's business, however, is the increasing stream of inquiries from railroads, ship builders and implement manufacturers. Orders for new rolling stock let during the past week include the 3,000 cars for the New York Central, while contracts recently placed with locomotive builders call for over 130 engines. Standard rails are quiet, though light rails are in good demand and selling from 50 cents to $1 a ton higher than a month ago. Sheets are fairly active and firm at 2.26½c for No. 28 gauge. Coke shows increasing firmness due to the withdrawal from the market of the leading Connellsville producer, though prices are as yet without change. There is little call for scrap, the leading consumers having their needs well covered for the balance of the year.

**Pig Iron.**—The pig iron situation in this market is very simple. All the Southern furnaces have advanced their prices to a minimum of $10 Birmingham for No. 2 foundry, and some to $10.50, but with one or two exceptions all have also withdrawn from the market. It is difficult to get a quotation nowadays, only those who are the regular customers of producers still willing to sell being taken care of at the present time. These are not allowed to buy more than a couple of hundred tons at the most, and prompt deliveries must be taken in every case. Foundrymen in pressing need for iron are turning to Northern furnaces for their wants, and the latter have booked a good round tonnage in the week. One local stack has advanced its prices 50 cents a ton, and is now asking $14 at the furnace for this year's delivery, and from 50 cents to $1 a ton for delivery in 1905. In some quarters, however, No. 2 iron can still be bought at $13.75 Chicago. The strength of the situation may be gathered from the sale of 5,000 tons of basic iron by a Southern producer at $12 Birmingham, an advance of $2.50 a ton over our previous quotations. Other basic wants are in the market, but consumers have declined to buy owing to the high prices asked by the furnaces able to deliver. In the sales of the week, malleable and Lake Superior charcoal have figured prominently, the latter now selling from $15.25 to $15.50 Chicago. We have revised our prices, and quote as follows:

| | |
|---|---|
| Lake Superior Charcoal | $15 25 to 15 50 |
| Northern Coke Foundry No. 1 | 14 25 to 14 50 |
| Northern Coke Foundry No. 2 | 13 75 to 14 00 |
| Northren Coke Foundry No. 3 | 13 25 to 13 50 |
| Northern Scotch Foundry | 15 00 to 15 50 |
| Ohio Strong Softeners No. 1 | 14 80 to 15 30 |
| Ohio Strong Softeners No. 2 | 14 30 to 14 80 |
| Southern Coke Foundry No. 1 | 14 15 to 14 65 |
| Southern Coke Foundry No. 2 | 13 65 to 14 15 |
| Southern Coke Foundry No. 3 | 13 15 to 13 65 |
| Southern Coke Foundry No. 4 | 12 90 to 13 15 |
| Southern No. 1 Soft | 14 15 to 14 65 |
| Southern No. 2 Soft | 13 65 to 14 15 |
| Southern Gray Forge | 12 90 |
| Southern Mottled | 12 65 |
| Southern Silveries (4% to 6% Silicon) | 14 85 to 15 85 |
| Jackson Co. Silveries (8% to 10% Silicon) | 18 30 |
| Alabama and Georgia Car Wheel | 18 85 to 19 35 |
| Malleable Bessemer | 14 00 |
| Alabama Basic | 15 65 |

**Billets.**—The demand for forging billets continues of excellent proportions and includes some large lots. The sale of 3,000 tons noted in our report of last week to a local consumer has since been increased by 2,000 tons, the total tonnage to this concern amounting to 5,000 tons. Association prices are without change. We quote Chicago delivery, on Bessemer and open hearth billets, 4x4 and larger, up to .25 carbon, $22.50; up to and including .60 carbon, $1 extra. Billets, 3-⅞ inches and smaller, and sheet and tin bars, $24.50. Wire rods, $26.50 to $27 Pittsburg.

**Bars.**—New business in iron and steel bars has not been of heavy volume in the past week. The specifications, however, against old contracts show an encouraging increase, notably those from manufacturers of cars and agricultural implements. All the Western mills are running to full capacity, while some plants that have been idle for several months are getting ready for an early resumption of operations. Prices are firm and without change. On mill shipments, Chicago delivery, we quote iron bars, 1.35c to 1.40c; soft steel bars, 1.40c to 1.46½c; soft steel angles, less than 3x3, 1.56½c; hoops, 1.71½c. There is a fair demand for hard steel angles rolled from old rails, and 1.35c to 1.40c is about the best that can be done in this market. Jobbers report a fair demand for merchant bars from stock, and we quote, iron, 1.70c to 1.75c base full extras; steel bars, 1.70c to 1.80c base half extras; hoops, 2c full extras.

**Sheets.**—The condition in this product is an encouraging reflection of the general improvement in the iron and steel trade. The demand has greatly increased since the first of October, and sales in the past week show a steady increase over the tonnage of the week preceding. There is very little disposition to cut prices, and quotations are now held firm as given below. We quote one pass, cold rolled, blue annealed sheets, carload lots, mill shipments, Chicago delivery as follows: Nos. 9 and 10, 1.71½c to 1.76½c; Nos. 11 and 12, 1.76½c to 1.81½c; Nos. 13 and 14, 1.81½c to 1.86½c; Nos. 15 and 16, 1.91½c to 1.96½c. On box annealed, one pass, cold rolled: Nos. 18 and 20, 2.01½c to 2.06..c; Nos. 22 and 24, 2.06½c to 2.11½c; Nos. 25 and 26, 2.11½c to 2:16½c; No. 27, 2.16½c to 2.21½c; No. 28, 2.26½c to 2.31½c; No. 29, 2.41½c to 2.46½c; No. 30, 2.51½c to 2.56½c. We quote lots from jobbers' stocks as follows: No. 10, 1.90c to 2c; No. 12, 1.95c to 2.05c; No. 14, 2c to 2.10c; No. 16, 2.10c to 2.20c; No. 18, 2.20c to 2.30c; No. 20, 2.25c to 2.35c; No. 22, 2.30c to 2.40c; No. 24, 2.35c to 2.45c; No. 26, 2.40c to 2.50c; No. 27, 2.50c to 2.60c; No. 28, 2.60c to 2.70c; No. 29, 2.70c to 2.80c. Galvanized sheets are fair and prices steady. We quote Pittsburg discounts, f. o. b. mill, 80 and 5 to 80 and 10. For shipment from stock, we quote heavy gauges and wide widths, 75 and 5 to 75 and 10 percent; for light gauges, 75, 10 and 7½ percent to 80 percent.

**Structural Steel.**—The outlook for the consumption of structural shapes in this market has not been so bright for over a year. The building operations contemplated in this city next spring are very heavy, including over a dozen large office buildings. Transactions in the past week have been limited to small lots of plain material, the aggregate tonnage of the week's sales being of good proportions. With the reservation that structural angles up to 6 x 6 can be bought at about $1 a ton below official prices, we quote carload lots, Chicago delivery: Beams and channels, 3 to 15 in. inclusive, 1.56½c; angles, 3 to 6 in., ¼-in. and heavier, 1.56½c; angles, larger than 6 in. on one or both legs, 1.66½c; beams, larger than 15 in., 1.66½c; zees, 3-in. and over, 1.56½c; tees, 3 in. and over, 1.61½c, with the usual extras for cutting to exact lengths, punching, coping, bending or other shop work. Store price on structural materials are 1.80c to 1.90c for angles, beams, channels, base sizes, with 1.90c to 2c for 18, 20 and 24-in. beams; tees and zees, 1.85c to 1.95c. These prices are for either random lengths or cut to lengths.

**Plates.**—Inquiry for plates continues of fair proportions, though it is yet susceptible of considerable improvement. New business is almost entirely confined to small lots of plain material, the bulk of which goes through jobbers' hands. We quote association prices, carload lots, Chicago delivery, as follows: Tank steel, ¼-in. and heavier, 24-in. wide and under, rectangular plates only, 1.46½c base; over 24-in. to 100-in. wide, 1.56½c base; flange steel, 1.66½c base; marine steel, 1.76½c base, all full extras. Plates, 3-16-in. thick, $2 extra; gauges 7 and 8, $3 extra; No. 9, $5 extra. Less than carload lots, 5c extra. Prices from store are as follows: Tank steel, ¼-in and heavier, 1.80c to 1.90c; 3-16, 1.90c to 2c; No. 8, 1.90c to 2c; flange steel, 2.05c to 2.15c.

**Rails and Track Supplies.**—There is some improvement in light rails, both as to demand and prices, the latter being from 50 cents to $1 a ton higher than a month ago. Heavy rails are quiet. Track supplies are active, a number of good sized transactions having been closed up in the week under review. We quote as follows: Heavy sections 500 tons and over, $28; less than 500 tons to carload lots, $30; less than carload lots, $32; second quality rails, $27; light rails, $22 to $24; track supplies, f. o. b. Joliet mill, angle bars, 1.30c; spikes, first quality, 1.60c; track bolts, 3¼ x ¾, with square nuts, 2.20c to 2.30c per 100 lb.; with hexagon nuts, 2.35c to 2.45c.

**Merchant Steel.**—Producers report some new contracts closed during the past week as well as a good volume of specifications. Prices are without change, and we quote carload lots, mill shipments, Chicago delivery, as follows: Spring steel, 1.85c; sleigh shoe, flat sizes, 1.51½c; concave and convex, 1.60½c to 1.71½c; cutter shoe, 2.25c; smooth finished machinery steel, 1.71½c; smooth finished tire, 1.66½c; plow steel, 2.20c and upwards, according to quality; toe calk steel, 2.01½c; crucible tool steel, 6½c to 8c; special grades of tool steel, 13c and up; cold rolled shafting 52 percent from list in carload lots, and 47 percent discount in less than carload lots.

**Merchant Pipe.**—Specifications for pipe show no diminution, jobbers and consumers laying in stocks for fall and winter use. Prices are without change, and we quote carload lots, mill shipments, random lengths, f. o. b. Chicago, as follows:

MERCHANT PIPE.

| | Steel Pipe. | | Guaranteed Wrought Iron Pipe. | |
|---|---|---|---|---|
| | Black. Percent. | Galv. Percent. | Black. Percent. | Galv. Percent. |
| ⅛ and ¼ inches | 69.35 | 53.35 | 67.35 | 51.35 |
| ⅜ and ½ inches | 73.35 | 71.35 | 71.35 | 69.35 |
| ¾ to 6 inches | 77.35 | 67.35 | 75.85 | 65.85 |
| 7 to 12 inches | 72.35 | 57.35 | 70.85 | 55.85 |

**Boiler Tubes.**—Demand seems to be on the increase, inquiries and orders coming in more freely than has been the case for several weeks. We quote carload lots, mill shipments, Chicago delivery, as follows:

BOILER TUBES.

| | L. W. Steel. Percent. | C. C. Iron. Percent. | Seamless Steel. Percent. |
|---|---|---|---|
| 1 to 1½ inch | 46.35 | 41.35 | 52.35 |
| 1¾ to 2¼ inch | 58.35 | 41.35 | 40.35 |
| 2½ inch | 60.35 | 46.35 | 43.35 |
| 2¾ inch to 5 inch | 66.35 | 53.35 | Up to 4 inches. |
| 6 to 13 inch | 58.35 | 41.35 | 50.85 |

The following are the agreed discounts from store:

| | Steel. | Iron. | Seamless Steel. |
|---|---|---|---|
| 1 to 1½ inches, inclusive | 42½ | 37½ | 40 |
| 1¾ to 2¼ inches, inclusive | 52½ | 35 | 37½ |
| 2½ inches, inclusive | 55 | 37½ | 40 |
| 2¾ to 5 inches, inclusive | 62½ | 47½ | 47½ |
| 6 inches and larger | 52½ | 35 | .. |

**Cast Iron Pipe.**—Routine business is all that producers have booked in the past week. No improvement is looked for until next spring, when the cast pipe season reopens. We quote carload lots, Chicago delivery, as follows: Four-inch water pipe, $25.50; 6-inch to 12-inch, $24.50; larger sizes, $24; gas pipe, $1 a ton higher.

**Wire Products.**—Nails and fencing continue to be the most popular in wire products, the entire consumption of mills going into immediate consumption. Prices are firm and without change. We quote carload lots to jobbers, Chicago delivery, mill shipments, as follows: Wire nails, 1.75c; painted barb wire, 1.90c; galvanized barb wire, 2.20c; smooth annealed wire, 1.60c; smooth galvanized wire, 1.90c; polished staples, 1.85c; galvanized staples, 2.15c. Less than carload lots to jobbers are 5 cents higher than above prices. The retail trade is quoted 5 cents extra over the foregoing on carload lots, and 10c extra on less than carload lots. Bale ties are unchanged at 82½c and 5 percent discount f. o. b. Waukegan, Ill., on straight carload lots. Poultry netting, 85 and 5 percent discount from list f. o. b. Joliet and DeKalb, with actual freight allowed not exceeding 50 cents per 100 pounds.

**Foundry Coke.**—The approach of winter heralds an improvement in the coke market. With the withdrawal of the Frick output prices have generally stiffened, though without change as yet. The demand is of fair proportions, the number of contracts for winter needs increasing from week to week. Prices are without material change, and we quote coke from Wise county, Va., $1.75 to $2 at the ovens, or $4 to $4.25 Chicago. Coke from the Pocahontas and New River districts, the freight rate of which to Chicago is $2.65, is selling on the basis of $1.65 to $1.75 at the ovens. Connellsville standard 72-hour grades, $1.90 to $2 at the ovens, or $4.55 to $4.65 Chicago. Milwaukee Solvay coke, $4.65 to $4.75 Chicago.

**Old Material.**—Operations in the scrap markets are confined largely to purchases and sales between dealers and producers of scrap. There is little demand from consumers, all the large melters being well covered for the balance of the year. Despite this condition, however, dealers continue to maintain prices at the high levels previously recorded, in some instances advancing quotations on products which are known to be scarce. These include old wheels, wrought pipe, No. 1 cast, cut boilers and mixed borings, all of which are selling 50 cents a ton higher than a week ago. We quote dealers' selling prices, gross tons, as follows:

| | |
|---|---|
| Old steel rails (4 feet and over) | $11 50 to 12 00 |
| Old steel rails (less than 4 feet) | 10 50 to 11 00 |
| Relaying rails, subject to inspection | 21 50 to 22 50 |
| Relaying rails for sidetracks | 18 00 to 20 00 |
| Old wheels | 11 50 to 12 00 |
| Heavy melting steel | 10 00 to 11 00 |
| Mixed country steel | 7 00 to 7 50 |
| Low phosphorus scrap (.04 and under) | 11 00 to 12 00 |

The following quotations are for net tons:

| | |
|---|---|
| No. 1 R. R. wrought | 12 00 to 12 50 |
| No. 2 R. R. wrought | 11 00 to 11 50 |
| Shafting | 12 50 to 13 00 |
| Dealers' Forge, No. 1 | 9 00 to 10 00 |
| Wrought pipe and flues | 9 00 to 9 50 |
| No. 1 cast, 150 lb. and less | 10 50 to 11 00 |
| No. 1 mill | 6 00 to 6 50 |
| Country sheet | 5 00 to 5 50 |
| No. 1 boilers, cut | 9 00 to 9 50 |
| Boiler punchings | 9 50 to 10 00 |
| Iron car axles | 16 50 to 17 00 |
| Steel car axles | 13 50 to 14 00 |
| Iron axle turnings | 7 50 to 8 00 |
| Steel axle turnings | 7 50 to 8 00 |
| Cast borings | 4 50 to 5 00 |
| Mixed borings, etc | 4 50 to 5 00 |
| Wrought turnings | 6 75 to 7 25 |
| Machine shop turnings | 6 75 to 7 25 |
| Railroad malleable | 9 00 to 9 50 |
| Agricultural malleable | 9 00 to 9 50 |
| Stove plate and light cast scrap | 9 00 to 9 50 |
| Old iron splice bars | 13 00 to 13 50 |

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David Evans, formerly president of the Field-Evans Iron Co., having arranged for the dissolution of that company, will in the future devote his entire time to the Chicago territory in the sale of the different brands of pig iron produced by the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., under the same arrangement that were in effect prior to the formation of the company of which he was president. His office will continue to be at 1029 Monadnock block, Chicago. Irvin McDowell will be associated with Mr. Evans as sales agent in this territory as before.

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## CLEVELAND.

OFFICE OF *The Iron Trade Review*,
1064 ROSE BUILDING, Oct. 19.

The improvement of the past two or three weeks has been well maintained this week, especially in pig iron, and the feeling throughout the trade is optimistic. That business will be better this winter than seemed probable a month ago is now believed to be certain.

**Iron Ore.**—There is a good demand for tonnage, but shippers are having no difficulty in contracting for all they need. The rates which have prevailed for three weeks have not changed except that the rate from Marquette has advanced from 60 to 65 cents. Present indications are that the shipments for October will amount to 4,000,000 tons against 3,006,857 in October, 1903. Ore prices are about as follows: Old range non-Bessemer, $2.65 to $2.75; Mesabi non-Bessemer, $2.50; old range Bessemer, $3.25 to $3.35; Mesabi Bessemer, $2.75 to $3.

**Pig Iron.**—The market is strong, with prices somewhat higher and foundrymen insisting upon immediate shipments on contracts. Local furnaces have advanced their quotations for No. 2 to $12.50 at the plants for Cleveland customers for prompt shipments and the first quarter of

1905. No iron can now be bought at $12 in the Valley for No. 2. For prompt shipment, prices range all the way from $12.25 to $13, the highest price being for popular brands by furnaces which have little to offer for the remainder of this year. The general disposition of furnaces is to name such high prices, from $12.25 to $12.50—for the first quarter that buyers are slow to place orders. Basic is selling at $12 to $12.10 in the Valley and Bessemer at $12.25. Charcoal iron shows little improvement. Some Southern furnaces now decline to sell at $10, Birmingham, for No. 2 and the result is that very little Southern is being sold in this territory. We quote as follows for Cleveland delivery:

| | |
|---|---|
| Bessemer | $13 10 to 13 35 |
| No. 1 Strong Foundry | 13 10 to 13 35 |
| No. 2 Foundry | 12 60 to 13 10 |
| No. 3 Foundry | 12 00 to 12 50 |
| No. 2 Southern | 13 85 to 13 95 |
| Gray Forge | 12 25 to 12 50 |
| Gray Forge, Southern | 12 25 to 12 50 |
| Lake Superior charcoal | 14 75 to 15 00 |

**Finished Material.**—Mills are busier on nearly all kinds of material. The improvement in structural material noted after the reduction in prices has been maintained, but sales have not increased largely during the past week. In rails, the business in light sections is satisfactory, but on standard sections buyers are awaiting possible reduction in price. With steel bars at 1.39½c Cleveland for Bessemer and 1.44½c for open hearth, there is not a very strong demand for bar iron at the advanced price of 1.35c at the mill, but the makers of bar iron say it can not be sold at less than that as long as scrap is held at the high prices prevailing. The sheet business is in pretty good condition and the smaller producers are not heard of so frequently in cutting prices. The prices of the principal producers through jobbers are as follows, Cleveland delivery, the freight from Pittsburg being 9½ cents: Mill sales of black sheets in carload lots, No. 10, 1.64½c; No. 11-12, 1.69½c; No. 14, 1.79½c; No. 16, 1.89½c; No. 27, 2.14½c; No. 28, 2.24½c. Galvanized, mill sales, No. 14, 2.24½c; No. 16, 2.34½c; No. 18-20, 2.49½c; No. 22-24, 2.64½c; No. 25-26, 2.84½c; No. 27, 3.04½c; No. 28, 3.24½c. Out of stock black sheets: ¼-in. 1.90c; 3-16-in., 2c. Blue annealed: No. 10, 2.05c; No. 12, 2.10c; No. 14, 2.15c; No. 16, 2.25c. One pass cold rolled: No. 18-20, 2.35c; No. 22-24, 2.40c; No. 26, 2.45c; No. 27, 2.50c; No. 28, 2.60c; No. 30, 3c. Galvanized out of stock: No. 16, 2.60c; No. 18-20, 2.70c; No. 22-24, 2.85c; No. 26, 3.05c; No. 27, 3.25c; No. 28, 3.45c; No. 30, 4.25c.

Jobbers do not seem to be benefited as much as manufacturers by the recent improvement in demand. The hand to mouth policy of buyers, which was adhered to for many months, brought many orders to the jobbers which usually go to the mills.

**Old Material.**—The market is strong and prices advancing, especially on iron rails, car wheels, malleable iron, busheling, machine cast and grate bars. Owing to the advancing prices, which buyers think are already high enough, sales are somewhat restricted. We quote as follows:

| | |
|---|---|
| Old iron rails | $18 00 to 19 00 |
| Old steel rails (over 6 feet) | 12 50 to 13 50 |
| Old steel rails (under 6 feet) | 12 50 to 12 75 |
| Old car wheels | 11 50 to 12 00 |
| Steel boiler plate | 9 00 to 10 00 |
| Malleable iron (railroad) | 12 00 to 12 50 |
| Malleable iron (agricultural) | 8 50 to 9 50 |
| Heavy steel | 12 00 to 13 00 |

We quote as follows, net tons:

| | |
|---|---|
| No. 1 R. R. wrought | $12 00 to 12 50 |
| No. 1 busheling | 11 00 to 11 50 |
| No. 1 machine cast | 10 00 to 10 50 |
| Iron axles | 16 00 to 16 50 |
| Axle turnings | 9 00 to 10 00 |
| Wrought turnings (free from cast) | 7 50 to 8 00 |
| Grate bars | 7 50 to 8 50 |
| Pipes and flues | 9 00 to 9 50 |
| Tank iron | 8 00 to 8 50 |
| Hoop and band iron | 5 00 to 5 50 |
| Sheet iron | 4 00 to 5 00 |
| Wrought drillings | 6 50 to 7 00 |
| Stove plate | 8 00 to 9 00 |
| Steel axles | 14 00 to 15 00 |
| Cast borings | 5 25 to 5 75 |

## CINCINNATI.

Oct. 18.

The coke market is firm and fairly active. For delivery this year the ruling quotation for foundry coke is within a range of $2 to $2.15 f. o. b. Connellsville. For next year's delivery there is a tendency to advance these prices about 10 cents per ton.

**Pig Iron.**—The week has developed further strength in the market and it is somewhat difficult to say just what prices are on Southern irons at this writing. It is a fact that orders have been refused by Southern furnaces at $10 Birmingham and that some sales have been made at the close of the week at $10.50 Birmingham. Buyers are in the market for $10 iron and all agents agree that a good tonnage could be booked at that price. It is not clear that much business could be done at $10.50, and there is not much likelihood of this being determined in the next few days, as there is practically no Southern iron offering. One of the largest producers in the South has withdrawn entirely from the market and refuses to quote, while the others are so well sold up that they are asking higher prices and only allow quotations to be made subject to confirmation and prior sale. The large interest that has withdrawn from the market is about the only important Southern furnace company that has iron on hand and at what figure it will come out is not made public. Quotations from Southern furnaces to sales agents range from $10.50 to $11 Birmingham as a basis. Northern irons have not responded in a similar way and quotations from Northern furnaces are as a rule $12 for this year's delivery and $12.50 for next year, although early in the week some business for next year was taken at $12. There were no large transactions reported in foundry irons this week, but it is known that the leading cast iron pipe interest is still in the market and is ready to take on a good tonnage. A sale of 1,000 tons of charcoal iron was reported and sales of basic aggregating 17,000 tons were made.

The trade is now more interested in the outlook for prices than in current business. There are many factors in the situation which come in for discussion. One of the questions to be decided is, Will the Southern furnace interests, under pressure of demand and advancing prices, come to an agreement with the labor unions and again get under way with normal production? On this point advices from Birmingham are all to the effect that there will be no compromise with the unions and that the contest will be continued to the end. The furnaces are gaining in this conflict all the time, although the progress is slow. When the price of Southern iron reaches $11 Birmingham, the Virginia furnaces will be a factor in the supply, as that district has all along been ready to sell at that figure. It is not clear what the Northern furnaces will do, but it is pointed out that the Northern makers may increase their production under the stimulus of a ready sale at $12 or better. It is also currently believed that the rank and file of foundry iron consumers are to a large extent covered for the balance of the year, and it remains to be seen if the market will continue, under an advance in price, to take up the iron so readily.

| | |
|---|---|
| Southern Foundry No. 1 | $13 25 to 13 75 |
| Southern Foundry No. 2 | 12 75 to 13 25 |
| Southern Foundry No. 3 | 12 25 to 12 75 |
| Southern Foundry No. 4 | 12 00 to 12 25 |
| Southern Foundry No. 1 soft | 13 25 to 13 75 |
| Southern Foundry No. 2 soft | 12 75 to 13 25 |
| Gray Forge | 12 00 |
| Northern Foundry No. 1 | 13 65 |
| Northern Foundry No. 2 | 13 15 |
| Southern car wheel iron | 17 25 to 17 75 |

**Finished Material.**—The demand is reported as improving and the trade feels encouraged as to the outlook. It is believed that the strength in the pig iron market cannot fail to have its influence on the finished products. Bar iron is conspicuously firmer, although not quotably higher. Bar iron is quoted at 1.35c; steel bars at 1.43c, half extras, with dealers quoting 1.60c to 1.75c for iron and steel out of store. Galvanized sheets are at 80 and 10 percent off. We quote black sheets, No. 27, at 2.25c in carlots of 500 bundles. Black sheets out of store are selling as follows: No. 28, 2.60c; No. 27, 2.50c; No. 16, 2.10c; No. 14, 2c; No. 12, 1.95c; No. 10, 1.90c. Tank plates are dull and sell out of store at 1.85c for ¼-in. and 1.95c for 3-16-in., No. 8 and No. 10. Beams and channels are quoted as 1.85c from stock and angles at 1.85c to 1.90c for base sizes.

In merchant pipe independent mills are contesting the trade sharply, which has resulted in a further shading of the schedule. The leading interest, however, is firmly maintaining previous quotations. Carload lots are quoted as follows f. o. b. Cincinnati:

MERCHANT PIPE.
(Basing Discounts.)

| | Steel Pipe. Black. Percent. | Steel Pipe. Galv. Percent. | Guaranteed Wrought Iron Pipe. Black. Percent. | Guaranteed Wrought Iron Pipe. Galv. Percent. |
|---|---|---|---|---|
| ⅛, ¼ inch | 69.7 | 53.7 | 67.7 | 51.7 |
| ⅜, ½ inch | 73.7 | 61.7 | 71.7 | 59.7 |
| ¾ to 6 inch, inclusive | 77.7 | 67.7 | 76.2 | 66.2 |
| 7 to 12 inch, inclusive | 72.7 | 57.7 | 71.2 | 55.7 |

BOILER TUBES.

| | Steel. Percent. | Iron. Percent. |
|---|---|---|
| to 1½ inch | 41.2 | 27.7 |
| 1¾ to 2½ inch | 54.2 | 36.7 |
| 2½ inch | 56.7 | 41.7 |
| 2¾ to 5 inch | 63.2 | 49.2 |
| 6 to 12 inch | 54.2 | 36.7 |

**Old Material.**—An improved demand is noted and prices are stronger in sympathy with the advance in pig iron. Quotations are revised and advances are shown for several kinds of material. We quote:

| | |
|---|---|
| Old No. 1 railroad wrought, net tons | $11 50 to 12 00 |
| Cast machine and foundry, net tons | 10 50 to 11 00 |
| Old iron rails, gross tons | 14 00 to 14 50 |
| Old steel rails, gross tons | 10 00 to 11 00 |
| Old short lengths, gross tons | 11 00 to 11 50 |
| Old iron axles, net tons | 14 50 to 15 00 |
| Stove plate, net tons | 7 00 to 7 50 |
| Wrought turnings, net tons | 6 50 to 7 00 |
| Cast borings, net tons | 4 50 to 5 00 |

## NEW YORK.

NEW YORK OFFICE OF *The Iron Trade Review*,
ROOM 1315, No. 150 NASSAU ST., OCT. 18.

**Pig Iron.**—So many conflicting elements entered into the market during the past week that definite conclusions are difficult. The Southern pig iron situation furnished the chief topic of interest. The leading companies are still refusing to take any orders, and several of the smaller companies have withdrawn from the market also. As a result the majority of sales agents say there is no Southern iron for sale for the time being. Prices have been irregular and are governed largely by delivery. For immediate delivery one company refused $11 Birmingham for several hundred tons of No. 2 foundry. Other companies declare they have no iron for sale for prompt shipment at any price. The attitude of buyers is hard to determine. The majority of them seem to have covered their requirements for the remainder of the year. Those that have not, and the tonnage they represent is quite large, are called upon to pay from $1 to 1.50 more per ton than a fortnight ago. But on orders calling for delivery the first quarter of the new year, prices range from $10 to $11 for No. 2 foundry, but buyers as a general rule are not willing to contract. In Northern irons prices remain unchanged, but are firmer than a week ago. Sales during the past week were made up mostly of Bessemer and basic. There are some good inquiries in the market at present, but the most of them are on analysis. The attempt of the Southern producers to boom the market is being closely watched, with opinion quite general that recent advances have not been warranted by any improvement in actual business. New York quotations at tidewater follow: Northern No. 1 X, $14.50 to $15; No. 2 X, $14 to $14.50; No. 2 plain, $13.50 to $14; Southern No. 1 foundry, $14.25 to $15.25; No. 2 foundry, $13.75 to $14.75; No. 3 foundry, $13.25 to $14.25; No. 4 foundry, $12.50 to $13.50.

**Rails.**—No large sales are reported, but orders for small lots made up a goodly tonnage, especially from street railways, and there is a steady business in light rails. Standard sections are $28 at mill.

**Finished Iron and Steel.**—Business in structural shapes during the past week showed a slight improvement over the week previous. The American Bridge Co. got the order for the new Wabash freight station in Pittsburg, which will take from 4,000 to 5,000 tons; it also booked an order for 2,500 tons from the D. L. & W. R. R. for a bridge at Buffalo. Small orders were a little more numerous. There is considerable estimating being done, but there is a decided reluctance to close. In bars, sheets and plates conditions are the same as a week ago, with nothing of a special character to note so far as the immediate future is concerned. New York prices at tidewater follow: Angles, 3 to 6 in. x ¼ in. and heavier, 1.54½c; beams, 3 to 15 in., 1.54½c; channels, 3 to 15 in., 1.54½c; beams, 18, 20 and 24 in., 1.64½c; tees, 3 x ¼ in. and heavier, 1.59¼c; plates, carloads, tank, 1.54½c; flange, 1.64½c; marine and ordinary fire box, 1.74½c; refined iron and soft steel bars, 1.44½c; sheets, in carload lots, New York, No. 28, black, 2.30 to 2.35c; galvanized, 3.10c to 3.35c.

**Old Material.**—The market continues to be a waiting one. Prices all around continue firm with holders confident of improvement. Offerings of rails have fallen off, and sales recently made commanded good prices. Heavy steel scrap is in good demand, with holders indisposed to sell. Cast scrap is active and strong also. We quote f. o. b. cars:

| | |
|---|---|
| Old iron rails | $14 00 to 14 50 |
| Old steel rails, long lengths | 11 50 to 12 00 |
| Old steel rails, short pieces | 11 00 to 11 50 |
| Relaying rails | 19 00 to 20 00 |
| Old car wheels | 11 50 to 12 50 |
| Old iron car axles | 17 00 to 18 00 |
| Old steel car axles | 14 00 to 14 50 |
| Heavy melting steel scrap | 11 50 to 12 00 |
| No. 1 railroad wrought scrap | 11 50 to 12 00 |
| Iron track scrap | 10 75 to 11 25 |
| Wrought pipe | 8 50 to 8 75 |
| Ordinary light iron | 6 00 to 6 25 |
| Cast borings | 5 00 to 5 25 |
| Wrought turnings | 6 75 to 7 25 |
| No. 1 machinery cast | 10 50 to 10 75 |
| Stove plate | 8 25 to 9 75 |

## PHILADELPHIA.

Oct. 18.

Although there are no important changes in conditions, all indications are favorable and the trade is in a very hopeful frame of mind. While orders are not as large and numerous as might be desired, demand has improved and prices are firm.

**Pig Iron.**—The pig iron situation, already strong, was further strengthened by the report on production and reduction of stocks for last month. Demand has increased to an encouraging extent, but prices show little change. We quote as follows:

No. 1 X foundry, $15. to $15.25; No. 2 X foundry, $14.25 to $14.50; No. 2 plain, $13.50 to $13.75; standard gray forge, $12.75 to $13; ordinary gray forge, $12.25 to $12.50; Southern No. 2 X forge, rail, $13.75 to $14; basic, $12.75 to $13; low phosphorus, $17.75 to $18; malleable iron, $14.50 to $14.75.

**Finished Material.**—The improvement is not so pronounced as in pig iron, but the demand for plates has increased and there is a change for the better in some other lines. The bar trade is inactive. We quote as follows: Plates, 1.43½c to 1.47½c; beams, channels and angles, 1.53½c to 1.65c, according to specifications, and small angles, 1.50c to 1.55c; bars, 1.43½c for carload lots for either iron or steel and the usual advance on part carloads.

**Old Material.**—The market is rather quiet, owing to the prices being high. Available stocks are firmly held. We quote: No. 1 steel scrap, $12 to $12.50; low phosphorus scrap, $16.75 to $17; old steel axles, $16 to $16.50; old iron axles, $19 to $19.50; old iron rails, $16 to $16.50; old car wheels, $12 to $12.50; choice railroad No. 1 wrought, $15 to $15.50; machinery cast, $12 to $12.50; No. 2 light scrap (forge), $10 to $10.50; light scrap (ordinary), $8.50 to $8.75; wrought turnings, $9 to $9.25; cast borings, $7 to $7.25; stove plate, $10 to $10.50; wrought iron pipe, $11.25 to $11.75.

## BIRMINGHAM.

BIRMINGHAM, Oct. 17.—Alabama pig iron manufacturers are holding off from sales for deliveries after Jan. 1, except at an advance again of at least 50 cents a ton for No. 2 foundry, and it is commonly reported that some orders have been booked. One of the larger producers has set aside something like 25,000 tons of iron on yards here to be held until the price goes up to $12 for No. 2 foundry, and the belief is expressed that the time is not far distant when this price will prevail. Several consumers of pig iron, including a large pipe concern, have been in the Birmingham market during the past week and several sales of 500-ton lots were made for delivery before Jan. 1. One local company is said to have held iron this year until the price went above $9.50 for No. 2 foundry and shipments now being made are at profitable prices. Large producers are out of the market and for next year quote $11 for No. 2.

The following pig iron quotations are given: No. 1 foundry, $11 to $11.50; No. 2 foundry, $10.50 to $11; No. 3 foundry, $10 to $10.25; No. 4 foundry, $9.50 to $9.75; gray forge, $9.25; No. 1 soft, $11 to $11.50; No. 2 soft, $10.50 to $11.

There is much activity in steel in this district. The Alabama Steel & Wire Co., which has a steel plant and blast furnace in operation at Gadsden, Ala., and rod, wire and nail mills in full blast at Ensley, Ala., reports that there is not a pound of goods in its warehouse and the product is being loaded from machines to railroad cars.

The Republic Iron & Steel Co. will blow out one of its furnaces at Thomas near here, on account of the coal supplies not being steady. The strike of the union coal miners is still on in this district. The Tennessee Coal, Iron & Railroad Co. continues to bring non-union workers to this district to take up work in the Bessemer, Ala., rolling mills where the output is improving right along.

The Birmingham Machine & Foundry Co. is working on orders for sugar machinery, engines and other work for Cuba, Porto Rico and other southern countries.

## The Metal Market.

### NEW YORK.

OFFICE OF *The Iron Trade Review*,
ROOM 1815, No. 150 NASSAU ST., Oct. 18.

**Pig Tin.**—Not in some time has the market been so active and strong as during the past week. General business is said to be better, and this with bullish manipulation has resulted in a buoyant market. London during the week reflected the strong situation here, and prices scored a notable advance, especially spot which is up nearly £3 over our last quotation. Closing prices today follow: Spot, 28.80c to 28.85c; Oct., 28.70c to 28.82½c; Nov., 28.66 to 28.80c. London's closings today follow: Spot, £132; futures, £130 15s. Arrivals are 1,695 tons, with 1,775 tons afloat.

**Copper.**—With buying for export quite heavy, and with domestic trade picking up, prices are slightly firmer than a week ago. Buyers, however, are cautious, with producers bullish on the outlook. The London market has been strong also, and prices advanced nearly £1. Closing prices today follow: Lake, 13⅛c to 13⅜c; electrolytic, 13⅛c to 13¼c; casting, 12⅞c to 13c. London closed today as follows: Spot, £60 5s; futures, £60 8s 9d. Exports aggregate 10,534 tons.

**Lead.**—Is active and higher at 4.25c to 4.30c. St. Louis is higher at 4.15c. London advanced to £12 3s 9d.

**Spelter.**—Is stronger and in good demand at 5.20c to 5.25c. St. Louis is firm at 5.00c. London is higher at £23 2s 6d.

**Antimony.**—All grades are considerably stronger. Cookson's is 7.25c to 7.50c; Hallet's, 7.00c to 7.25c; other grades, 6.25c to 6.50c.

### CHICAGO.

OFFICE OF *The Iron Trade Review*,
1164 MONADNOCK BLOCK, Oct. 18.

The demand for metals in this market is of fair proportions, though the trade cannot be said to be of an active nature. Both copper and pig tin show an increase in price, the latter as a result of the decreased shipments to this country from abroad. The fluctuations in copper are largely the result of speculation, and the recent advances are not by any means permanent. We have revised our prices, and quote as follows: Lake copper in carloads, 13¼c, and for smaller lots, 13½c; casting, 13c for carloads, and 13⅜c for lesser quantities. Pig tin, 29⅝c to 30c, according to quantity Spelter is stronger and is now quoted 5¼c to 5½c, according to quantity; sheet zinc, 5.90c to 6c for carload lots of 600-lb. casks, and 6.25c to 6.30c for less than carload lots. Pig lead, 4.20c for 50-ton lots; 4.25c for carload lots, and 4.35c for smaller lots.

There is a fair buying of old metals, though prices are not as strong as formerly. We quote wire and heavy, 11¼c; copper bottoms, 10c; copper clips, 10¾c; red brass, 10c; red brass borings, 7¾c; yellow brass, heavy, 7¼c; yellow brass borings, 6¼c; light brass, 5¾c; tea lead, 3¾c; zinc, 3.65c.

## "AMERICAN" STEEL WORKS IN CANADA.

TORONTO, Ont., Oct. 15.—A great stimulus has been given to the iron and steel industries of this country by recent legislation. The $7 duty on steel rails goes into effect Nov. 1, and there is consequently a rush on the part of American rail mills to fill existing contracts before that time, while new orders are going to Canadian producers. The "anti-dumping" amendment to the tariff is being rigidly enforced. Where contracts are made by American firms for the installation of machinery, duty has now to be paid not merely on the articles imported, but on the whole contract price, including the cost of the labor employed in Canada in the work of installation. The effect of this is to confine American contracts to the shipment of machinery and give installation work to Canadian firms.

The result of these tariff changes, coupled with the great prospective demands caused by railroad construction, has been to stimulate activity in iron and steel manufacture and to increase the tendency on the part of American capitalists to retain a share of the Canadian market by investing in Canadian enterprises. A rumor has had currency that the United States Steel Corporation had secured control of the Northern Iron & Steel Co., whose plant is situated at Collingwood, Ont. While it has been denied as premature, it turns out to have some foundation. Major John A. Currie, president of the Northern Iron & Steel Co., states that overtures looking towards securing control had been made by a prominent official of one of the large American steel companies and negotiations entered into. The proposition contemplated the enlargement of the Collingwood plant by the addition of two blast furnaces and perhaps a steel rail plant. In the meantime, however, further legal proceedings have been taken in the name of the Cramp Steel Co., Ltd., to obtain an injunction restraining the transfer of the plant and assets of that company to the Northern Iron & Steel Co., Ltd.

The Dominion Iron & Steel Co., Sydney, N. S., in which Toronto capital is largely interested, has its new washing plant completed and partially in operation. The new rod mill is turning out a high grade quality of rods. The construction of the steel rail mill is being pushed forward rapidly, the contract providing that it should be in readiness for operation early in the year. The foundations are completed and a portion of the machinery has been shipped. The company has contracted with Pruck, Kretschel & Co., of Osnabruck, Germany, for the installation of a plant for the utilization of waste ore in the manufacture of pig iron in accordance with a process for agglomerating flue dust, discovered some years since by the German firm. This plant will cost about $8,000 and will have a daily capacity of about 75 tons. The plant is not so far in use on this continent and the Dominion Iron & Steel Co. will hold exclusive rights in the process for Canada.

It is reported that a recent visit to Canada of John A. Tapping, president of the American Sheet & Tin Plate Co., had to do with the proposed Steel Corporation plant on the Canadian side. In the event that the legal complications of the Cramp Steel Co. prevent the carrying out of the Collingwood project some other location will be selected. Peterboro, which is seventy-five miles east of Toronto on the Midland division of the Grand Trunk, is considered in this connection.

Dr. J. M. Bell, who has been exploring the Michipicoten iron ore district, reports to the Ontario Bureau of Mines that the iron-bearing area has been found to be considerably more extensive than he supposed. New deposits have been discovered in several places, the most promising being at Cameron lake and on the Tucaswa river, where bodies of magnetic occur.

The Nipissing Foundry & Machine Co., Ltd., of North Bay, Ont., has been incorporated with a capital of $20,000. The provisional directors are Robert Booth, Robert William Gordon and Alfred J. Young.

Bids for 100 sets of 3-in. gun forgings were opened at the Bureau of Ordnance, Washington, D. C., Oct. 12. The three bidders were the Midvale, Crucible and Bethlehem companies. The bids were all the same, 40 cents per pound. No award was made.

## A NEW CENTER PUNCH.

There are any number of variations in center punches and the varied forms largely depend upon the class of work. A toolmaker requires something quite different from a boilermaker, the two representing extremes in center punch requirements. This is but a general rule, of course, as there are doubtless toolmakers of no unusual delicacy of touch and there are certainly boilermakers using the center punch with a high degree of accuracy. A light piece of tool steel of suitable size for the work, having a nicely coned and tempered point, a point which will be sharp enough to penetrate easily and yet strong to stand up well under the strain of drawing an incorrectly located dot back or forth—this is about all that the average workman expects of a center punch. Of course, he will expect more when he sees something better and there is at least one possibility of improvement in the center punch.

Center punch action usually involves a two-handed operation. The hammer and the punch are handled separately and up to the present this has been the approved method of center punch operation in the shop and elsewhere. It is

FIG. 1.—A NEW AUTOMATIC CENTER PUNCH.

easily seen that the workman could use to good advantage another hand and arm. He can borrow these; and if nothing further is required than temporarily holding down a piece of work, then everything moves smoothly if the owners of the different hands are of the same mind and co-operate without friction or delay. But when it comes to the united action which calls for the use of a magnifying glass in connection with the other tools then there is possibility of trouble with even the most agreeable and trustworthy of assistants. The workman is then perforce compelled to rely upon himself as far as this may be done at all, to first scan the magnified surface, adjust the center punch and take up the hammer when he lays down the glass, and then—just about then the center punch may slide away and the whole thing is to be done over again. The workman may count himself lucky if he can feel the slipping punch as it dodges under the gentle pressure of his fingers. It may be that he has held so slight a tension between the center punch and the work, that the erring movement has been imperceptible and he has gone ahead with unfortunate results. The more delicate the work, the more likely trouble is lurking around the apparently simple but always important task of the center punch. There are die-sinkers who trace along one of two intersecting lines until they reach the point where the lines cross and there their sense of touch is sufficiently delicate to feel the difference and they halt the sliding center punch and give it a light tap with the hammer to further mark the faint meeting of the lines.

The Brown & Sharpe Mfg. Co., of Providence, R. I., recognizing the limitations of the center punch and the hammer when in co-operation but in separate hands, has combined the two in a single tool. Due care has been taken in the design to combine lightness and simplicity with durability. The various parts have been proportioned to withstand the severe usage to which a tool of this character will be subjected. All the parts are of steel and so proportioned and aljusted to avoid the liability of getting out of order. The parts most subject to wear are hardened. The tool is self-contained, the striking mechanism being enclosed in the knurled handle which is of such size and shape as to be conveniently held in the hand. The center punch, illustrated in Fig. 1, is about 5¼ in. long and ⅝-in. in diameter.

Fig. 2 shows a section through the tool. A hardened steel hammer block A is actuated by a spring B. A hammer lifter is seen at C and there is a bushing D to release the lifter when the hammer is at the proper height. E is a lifter washer and F is the spring for holding the punch in place at the bottom end of the stroke.

When following a line or establishing a point by the intersection of lines, one hand can be free to guide the center punch or hold the magnifying glass and after the place is located the tool is not so liable to slip and lose the setting, as a downward pressure of the handle releases the sliding block and makes the desired impression in the right place. Another advantage which will be appreciated by mechanics is that the punch marks are of uniform depth and are therefore more easily and accurately followed than when of varying sizes.

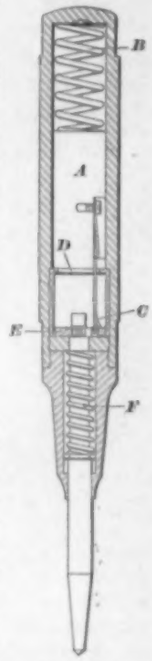



FIG. 2.—DETAILS OF NEW CENTER PUNCH.

## Orders for Railway Equipment.

The most important railroad order of the past week was that of the New York Central for 1,500 box cars from the Western Steel & Foundry Co. and 1,500 drop bottom gondolas from the American Car & Foundry Co. The company is also reported in the market for 2,000 steel cars in addition to the orders placed above. The Cincinnati Traction Co. has ordered 50 semi-convertible cars from the Cincinnati Car Co. The Southern has ordered 1,000 steel cars from the American Car & Foundry Co. The Central of Georgia has ordered 500 ventilated box cars from Haskell & Barker. The Swift Refrigerator Transportation Co. is asking bids on 200 stock cars. The Pennsylvania is in the market for 200 coke cars. The Wheeling & Lake Erie has ordered 1,000 coal cars from the American Car & Foundry Co. The German-American Car Co., Chicago, has ordered 1,500 refrigerator cars from the Standard tSeel Car Co. The following are reported in the market for cars: Wabash, 2,000 freight cars; Baltimore & Ohio, 3,000 freight cars; Dominion Coal Co., 100 cars; Quebec Southern, from 100 to 200 box cars, and the Canadian Pacific, 50 tourist cars.

The following railroads have ordered locomotives: New York Central, 28; Central Vermont, 9; Maine Central, 8; Intercolonial, 25; Central of New Jersey, 12; Pennsylvania, 25; Toledo, St. Louis & Western, 10.

In the month expiring with Nov. 1, it is expected that 100,000 tons of steel rails will be exported to Canada. The large shipments are due to the fact that in order to escape the new Canadian duty of $7 per ton on steel rails, all rails ordered from the United States prior to Aug. 23 last must be shipped into Canada before the first day of November.

# Shrinkage Troubles and Methods of "Feeding."*

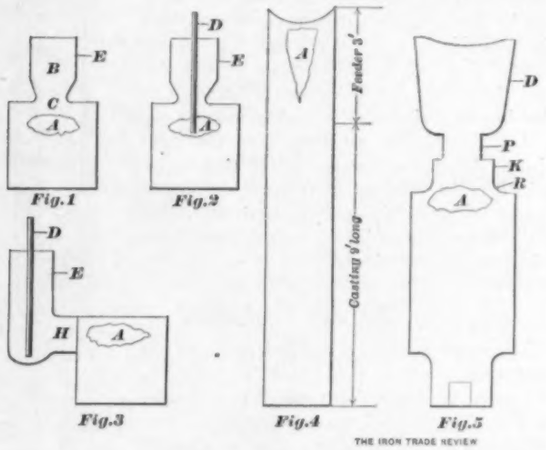
BY THOS. D. WEST.

A casting that is not sound is weakened in a way that makes it impracticable to apply any formula to ascertain its strength. The extent to which such unsoundness affects the life of the casting depends chiefly upon the location of the defects. In some cases unsoundness may not be of great importance, while in others it may be so serious as to unfit the casting for use; but discrimination in this respect must be left to experience and judgment.

Unsoundness in castings is produced by one of three things: A "blow hole," "dirt hole," or shrinkage. Rarely if ever are two of these factors combined. The unsound spot must be produced distinctly by either gas, dirt or shrinkage. However, it is possible for dirt to lodge in a section that would also shrink. I dwell on this feature because I believe it will assist in forming correct opinions as to the cause of any unsoundness to be found in castings.

**Shrinkage as Distinct from Dirt or Blow Holes.**

A few days before writing this paper I received a defective section of a valve casting, and was asked to indicate the cause of the defect. This special valve casting had to stand several hundred pounds of hydraulic pressure test, which, when applied, caused a leakage or sweating of the casting at the pouring gate section. The parties sending this sample were at a loss to know whether the porous condition was due to shrinkage or dirt. They seemed sufficiently experienced to




know it must be one or the other, and their doubt was natural since it was difficult for the eye alone to discern which it was. The first thing I did was to apply a magnifying glass. This enabled me to be very emphatic in attributing the trouble wholly to shrinkage, and I wrote them that if they would change their pouring gate to a lighter section I believed their trouble would cease. I heard no more from them.

Examination by the glass showed the section that leaked to be of an open, stringy structure, reminding one of a lot of peas tied together with very fine thread. The open spaces were entirely free of any dirt, whereas the solid section of the casting was of a close uniform density. There was not the least sign of dirt being confined between the spaces, or open grains of the iron. Some might refer the trouble to confined gases causing "blow holes." These do not exist as an opened-grained, stringy structure as in some forms of shrinkage. Any sponginess or holes due to confined gases appears in cavities surrounded with a structure denser than that adjoining the defects; and the surface of blow holes often appear as smooth and dense as the interior of a piece of blown glass. In fact, the formation of holes by expansion of air or gas are upon the same principle. Molten iron or glass is easily separated by air or gas pressure, forming a void space before solidification and molten iron will liberate gases up to a certain decrease in its temperature, just as air can escape from water before it freezes. Let one fasten the above facts in his mind and there should be no difficulty in determining whether a defect is caused by dirt, confined gases or shrinkage.

*Read before the New England Foundrymen's Association, Boston, Mass, Oct. 12, 1904.

**Symbols for Methods of Treating Shrinkage.**

In presenting this question of shrinkage I am reminded of the excellent paper on this subject presented to you last March by Mr. Herbert E. Field. Shrinkage has been greatly discussed both in the shop and press, and it is difficult to bring out much original matter; however, I believe I have a few new thoughts, the consideration of which should prove profitable.

There are several different methods for preventing shrinkage evils in castings. At present we have no terms or symbols to designate one method from another and it appears to me that to have symbols that can be universally applied would prove of service to all interested. The terms I offer to cover the present different forms of general feeding are: 1, interior rod feeding; 2, exterior rod feeding; 3, statical pressure feeding; 4, chill feeding; 5, compression feeding. The first and second terms may be used in some cases with the word rod omitted. The question of symbols is taken up at the close of this paper.

It is surprising how few molders and founders comprehend the difficulty of making a bulky casting perfectly solid throughout its body, and it is to be said that while skill in placing proper feeding heads and in feeding can accomplish much in avoiding the evils of shrinkage, there are forms that baffle the most skilled attempts to make perfectly solid castings.

**Difficulties in Feeding and Rate of Cooling.**

The great difficulty in obtaining a perfectly solid body in many forms of bulky castings is due to the exterior part solidifying before the interior, and the impracticability oftentimes of conveying to the part solidifying last, the hot metal that will fill the void space left and replenish the shrinkage. In the solidification of a casting the radiation of heat is greatest upward. The bottom and sides will solidify to a greater depth than the uppermost or top body before the whole has become solidified. As an example, a cube casting, as in Fig. 1, would have the part last to solidify at about the height seen at A. If the one feeding such a casting can maintain open communication between the hottest part A and that of the feeding head at B until A has solidified he can produce a solid casting; otherwise he will fail. What works against reaching A with occasional supplies of hot metal in such castings is the early cooling off of the top body at C. It is difficult to keep it in a liquid state to the same length of time that the metal is liquid in the more central section at A. This is generally accomplished by the use of what is termed a "feeding rod" seen at D, Fig. 2. This is kept in motion up and down as well as sidewise. Its action keeps mixing the metal in the feeding head E, with that in the interior of the casting. This "interior rod feeding" applies to all forms of feeding where feeding heads are placed directly upon the top or cope surface of a casting.

**Interior Rod Feeding.**

"Interior rod feeding" secures a perfectly solid casting providing the person working the feeding rod D can keep a liquid communication between a feeding head and the interior of the casting, or that part last to solidify. To do this, as all experienced molders know, requires the greatest care and skill, and it is to be said that without these more harm than good can be done. The great difficulty with this method of feeding is in keeping the passage for fresh supplies of hot metal open until the hot spot A has solidified. The term "hot spot" was first brought out by a writer in the *Foundry* several years back. The cost of chipping off large feeding heads and the great danger of cracking some castings in doing so, cause most persons to use smaller feeding heads as a rule than should be employed. Were it possible to have feeding heads as large as the body to be fed, similar to the feeding heads for cannons, plain shafts, etc., seen at Fig. 4, there would be little difficulty in obtaining a solid interior in bulky castings.

**Exterior Rod Feeding.**

In taking up the exterior rod feeding, which covers all that class of work having the feeding head E set to one side of the casting and a connection cut between the two as at H, Fig. 3, a feeding rod D is generally used, the same as in Fig. 2. The main difference between the Fig. 2 and Fig. 3 plans lies in the latter never permitting the feeding rod to penetrate

the casting or its "hot spot." This militates greatly against obtaining a perfect solid casting unless the feeding head E and connection H are as bulky as the casting, and even then the earlier solidification of the sides ahead of the upper center body of the casting will prevent the connection H from conveying metal to the hot spot A. However, it is to be said that exterior rod feeding, in the hands of the majority of molders, can be generally relied upon to give a more solid casting than the interior rod feeding of Fig. 3; at least there will be more of the external appearances of soundness in rough castings by the plan of Fig. 3 than by that of Fig. 2, whatever may be the internal conditions of the "hot spot." Some years back a writer in the *American Machinist* stated that he could make solid castings without feeding, or "pumping," as a few call it. He must have been deceived by external appearances, or well acquainted with the deceptive qualities of exterior feeding, and wanted others to accept external appearances to verify his claims.

**Statical Pressure Feeding.**

This third form includes all that class of feeding involved in the casting of cannon, shafts, rolls, etc., cast on end, where the feeding head is often made the same area as the casting or larger, extending it so that the whole may often appear like one casting without a feeding head, when taken from the mold. The principle involved is seen in Fig. 4. Here the shaft casting wanted is nine feet long, having a feeding head of three feet long to make the casting solid. At A is seen the hot spot, or the body from which the metal descend to supply the shrinkage of all below it. In depending upon self-feeding, long feeding heads are necessary, and it is generally advisable to feed with a rod a few moments after adding fresh supplies of hot metal in the head, and this should be kept well covered with blacking dust, etc., to prevent the escape of heat as far as possible after every addition of new metal, and a few rod feedings.

In the case of rolls that have the neck K, smaller than the body, in connection with wabblers P, it is very necessary, if employing feeding rods, to use one after every fresh supply of hot metal, in order to feed up the hot spot A; and at the latter end of the feeding the rod must be constantly used with the greatest skill, otherwise shrink holes or sponginess will be found in the neck at R, when finishing the rolls. Especially is this true of rolls having large bodies and small necks. Wabblers in roll molds are so effective in closing up the connection between the body K and head D, to prevent new metal reaching the hot spot A, that some roll founders have left them out to be machined, to form after cutting off the feeding head. Where the wabblers are omitted some depend almost entirely on self-feeding of the head, by covering it well with blacking dust after every fresh supply of hot metal. In fact this is often much safer than depending on the majority of molders to make rolls solid by working a feeding rod.

The secret of making solid rolls is to keep on reaching the hot spot with fresh supplies of hot metal until it has solidified, and he that can best do this will be least likely to find shrink hole or sponginess at R when finishing the rolls, or the neck breaking off when they are in use. Many molders think that as long as they can keep the top and neck body of their feeding heads in a good liquid state they are doing all that is necessary; nevertheless these remarks on the advisability of reaching the hot spot with all the hot metal possible, as well as keeping the top of the feeding head good and hot, should cause some to do a little deeper thinking.

**Chill Feeding.**

This method is one which seeks to prevent the formation of a hot spot and consists in forming of iron any section or part of a mold for a casting that gives trouble from shrinkage, forming in sand all other parts of the casting. The chill or "chiller," as more recently termed, causes the part or parts that would be among the last to solidify, if formed of sand, to solidify in closer unison with the lighter parts that would draw metal from it, to supply their shrinkage. This is of late origin and many use the method to good advantage.

**Compression Feeding.**

This embodies complex proportions in thickness of castings and forms of cores, or core irons, as well as any compression methods that may be used. The expansion of the cores by reason of the rods in them, may be so great as to compress or drive the metal from heavy parts to supply the shrinkage of light, so as to decrease the body in which the "hot spot" would be created were there not a pressure to compress such heavy parts into less space. This expansion of cores or rods has been known to drive metal back out of risers and cause castings to come larger than the pattern from which they were made.

**Symbols of Feeding Methods.**

With the proper advance in founding it would be of advantage to have signs as well as words to designate feeding methods. In making out orders for casting, steel or rubber stamps could be used to mark on orders or chalk to mark on patterns, any methods designated in Nos. 1 to 10, Fig. 6. The foreman would thus have better assurance of molders following his desires in the choice of methods. If the foreman takes no interest in the matter but leaves it

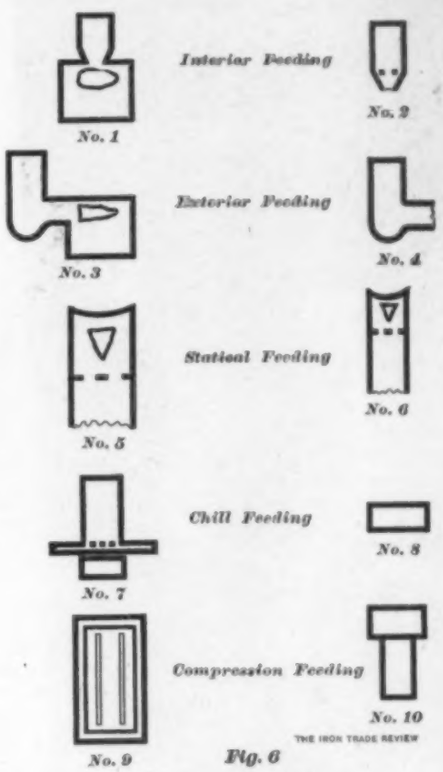


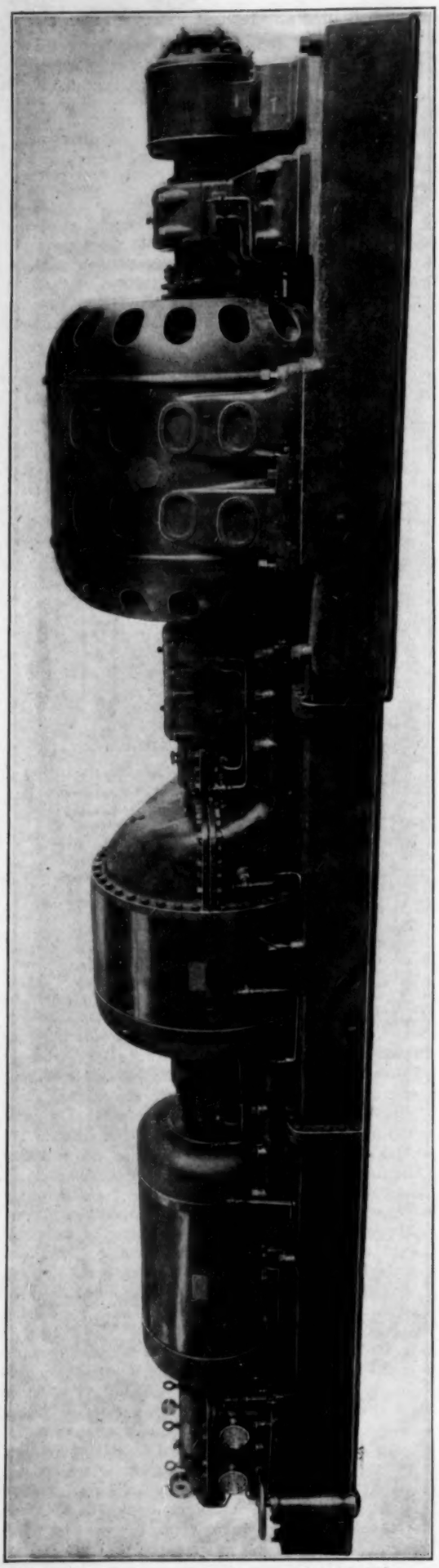

*Fig. 6*

with the molder to do as he pleases, as many do, the knowledge that order blanks have provision for shrinkage symbols should cause him to recognize it as something he should study more and have better control of. The size of feeders and their position can be marked on the pattern, and if cross bars, etc., will not permit their attachment at the place designated then the molder will feel called upon to consult the foreman, instead of going ahead regardless of results, as too many do.

Drawings may also be marked in some cases with a symbol of the best method to insure sufficient solidity of the casting. If the existence of terms and symbols to designate different methods of feeding did no other good than to cause designers and draughtsmen to study the subject of shrinkage and thus make designs that would aid in securing solid castings, a good work would be done.

It is intended that the symbols opposite each other, as No. 1 and No. 2, will indicate the same method of feeding. The only differences are that one form is simpler and takes less space than the other, and that the larger symbol shows the hot spot, which might in some cases attract more attention to the necessity of good long feeding.

Whether the terms and symbols given herein are adopted by any, this paper may be of benefit in causing recognition of the different methods that can be employed, and thus decrease the evils of shrinkage, giving us sounder castings and insuring greater use of cast iron products—a consummation which those interested should aid all they can.



THE HAMILTON-HOLZWARTH STEAM TURBINE.

## THE HAMILTON-HOLZWARTH STEAM TURBINES.

The Hooven, Owens, Rentschler Co., of Hamilton, O., has a turbine on exhibition at St. Louis. It is directly connected to a 1,000-k. w. generator and is designed to operate under 185 lb. initial steam pressure and 28 in. vacuum at 1,500 revolutions per minute. This turbo-generator is in operation in Machinery Hall, block 46.

For units of 750-k. w. and upwards the builders divide the rotating body into two parts, the high and low pressure turbine. Smaller units are in one turbine casing. The turbine casings and pedestals for the bearings and the generator are placed upon a rigid bed plate of the box pattern, the top of which is accurately planed to receive them. This insures perfect alignment of all parts. All steam, oil and water piping, including the steam inlet, regulating and bypass valves, are within and below the bed plate. After having passed through the steam separator, which is located below the bed plate, the steam passes through the main inlet valve. This valve has an extended stem which is connected with a floor stand and handwheel located on the floor close to the high pressure end of the turbine; it then passes through the regulating valve and from there through a curved pipe to the head of the high pressure turbine. From the ring channel of this head the steam flows through the first set of stationary vanes, which changes its directions and imparts the necessary velocity. These vanes are rigidly connected to the head. From here the steam flows in a full cylindrical belt interrupted only by the vanes of the first running wheel, and from here to the following stationary discs, and so on.

From the last running wheel the steam is led through receiver pipes to the front head of the low pressure casing, or if there is only one casing, immediately to the condenser. This condenser, either jet or surface type, is placed as near as possible to the exhaust opening. In the low pressure casing the steam is distributed in the same manner as in the high pressure turbine. The low pressure front head, however, has an additional nozzle through which live steam enters the low pressure casing for use in case of overload. The first stationary disc of the low pressure turbine has guide vanes all around its circumference so that the steam enters the low pressure turbine in a full cylindrical belt, interrupted only by the guide vanes. These vanes of the stationary discs have a varying radial height, increasing in the direction in which the steam flows. This allows the steam to expand within the stationary vanes. At the same time, the vanes guide the steam under such a small angle that the force with which the steam impinges the next following running wheel is as effective as possible. The curvature of the vanes is such that the steam will increase its velocity while passing through the stationary vanes in a ratio corresponding to its operation.

The purpose of the stationary disc is, as before mentioned, to prepare the steam for its action in the power transmitting part of the turbine (the running wheels). They do not move and take, therefore, the back pressure of the impinging force of the steam exerted in the running wheels. Within the vanes of the stationary discs the steam has to expand, to accelerate and to change its direction with the best possible efficiency. In the bore of the stationary discs, runs, with as small clearance as practical, the hub of the running wheel. This clearance, which is by no means to be avoided, is the cause of the leakage losses. The makers extend the stationary discs nearly to the shaft of the turbine and have restricted these leakage losses to a minimum practical limit.

The stationary discs are located in grooves in the turbine casings, which are split horizontally and so designed that with the smallest weight the strains in the material due to the static steam pressure do not exceed the limits usually allowed in ordinary practice. The vanes are drop forged steel, milled and located in a groove on the outside periphery of the discs. Milling these vanes secures an accurate spacing and absolute control of the angle in which they are placed into the edge of the stationary disc.

The vanes are fastened to the discs by rivets; after which the disc and vanes are ground on their outside edges, giving the vanes the profile they should have for efficient steam expansion. Then a tough steel ring is shrunk on the outside periphery of the vanes and steam channels. This design gives absolute control of the length and spacing of the vanes during manufacture, and insures efficient workmanship.

The running wheels are the power transmitters of the steam turbine. Next to the stationary discs they are the most important part of the turbine. Though the steam flows through the running wheels in the same way as through the stationary discs, their features are quite different from the latter. While the weight is not an important factor in the stationary discs, it is a foremost one in the running wheels. These running wheels ought to be as light as possible on account of the efficiency of the turbine, for the heavier they are the stronger and larger the diameter of the shaft and necessarily the bore of the stationary discs, and therefore the greater leakage loss through this annular opening. Besides this they have to be strong enough to stand the strains due to the centrifugal stresses. They also have to run perfectly true, and it is of vital importance that they are perfectly balanced. Their vanes should have edges shaped exactly right, so that the influx and efflux directions of the steam are the most efficient. The vanes should be fastened to the running wheels in such a way as to insure absolute safety.

The turbine has wheels with cast steel hubs. Steel discs are riveted to both sides of the hub and form a circumferential ring space into which the vanes are held by means of rivets. On the outer edge of the vanes is tied a thin steel band around the wheel in order to give an outside wall to the steam channels. The vanes are milled on both edges on the influx and efflux side of the wheel corresponding to the theoretical angle diagram.

To reduce the weight of the vanes as much as possible and their stress on the rivets, they are made hollow lune shaped. These vanes are milled on both edges; they are cut to lengths according to the size of the vanes, and steel clips with welded channels are pressed on one end, after which they are milled so that they fit on the running wheels. Tests made with these vanes have shown that it takes over 1,000 pounds to pull them out of the clips.

The principal feature for a quiet running machine is the condition of the perfectly balanced rotary body and for this purpose the builders have designed and built a machine with which they can balance every wheel within 1-16 of an ounce. The principal idea of this balancing machine is to use the principles of the physical balance. The running wheel swings with knife edges on hardened supports. On both sides of this support are two balances with unequal arms, the short one carrying the weights, the long one being connected by means of a connecting rod with a knife edge attached to the band of the running wheel. Everything swings on knife edges. If there is any unbalanced mass in the running wheel, one of the balances will indicate this. The added weight immediately shows the eccentric mass. Drilling a hole takes off this eccentric mass. Repeating this method several times and in several diameters of the wheel gets out all eccentric masses. The balancing is the last operation in the manufacturing of the running wheels.

The bearings are the only part of the turbine proper (with the exception of the governor, regulating mechanism and pump) where metal comes into contact with metal; here the friction of running parts has been reduced to the minimum by using ample quantities of oil. The bearings for the turbine shaft have much less weight to support than those of the generator shaft, and therefore can be made short with straight cylindrical shells, while it is necessary that the bearings of the generator have ball shaped shells to insure their alignment with the shaft. In both kinds of bushings or shells the top and bottom halves are screwed together. The pedestals and the caps are so designed that the oil inlet and outlet are close together on the side of the pedestal, no piping has to be deranged to take out the bushings. The oil flows to the bottom bushing under a slight pressure, then moves with the rotating shaft and is taken off in the cap. From here it returns to the oil outlet in the pedestal. The dimensions of the bearings are ample and they can be guaranteed to run cool without any risk. With the thrust ball bearings on the exhaust side of the turbine the whole shaft can be moved in an axial direction and change the position of the running wheels to that required by the stationary discs. Flexible couplings are used between the high pressure and low pressure shafts and between low pressure shaft and generator shaft, each shaft can therefore be fixed and located without affecting the location of the other shafts.

The high pressure shaft and casing as well as the low pressure, can expand easily. Both are held rigid only at their cool or exhaust end by the high pressure and low pressure pedestals. The casings are not fastened to the bed plate. They as well as the shaft and running wheels can slide or expand against the direction in which the steam flows. On the hot or intake end there is no rigid connection, not even between the pedestal bearing and the high pressure casing, nor between the low pressure bearing and casing.

The couplings used for connecting the high pressure and low pressure shafts, also the low pressure and generator shafts are of novel construction. Each half of the coupling consists of a disc screwed upon the shaft and secured to it by means of keys. Near the outer circumference these discs have steel laminations, connected to brushes, secured to the coupling disc in an absolutely safe way. The brushes of one disc fit between the corresponding brushes of the other disc, so that several pairs of brushes distributed over the circumference will always lean together in whatever direction the coupling turns.

At the four places where the shaft enters the steam chambers of the casing is a special stuffing box. The principle of this stuffing box is based on the fact found on numerous tests, that a shaft revolving in a sufficiently long box with small clearance throttles the steam which tries to escape along the shaft. To avoid a long box, which considerably lengthens the shaft, the designer makes practical use of the idea so cleverly used in telescopes. A ring fastened to the shaft and revolving with it, extends axially into the deep groove of another ring which does not revolve. The space between this ring, the bushings and the shaft, is connected with a drain pipe on the pressure side and a water pipe on the vacuum side.

The governor is of the spring and weight type especially adapted to high speed, and designed for the special purpose of turbine governing. The governor is directly driven by the turbine shaft, revolving with the same angular velocity. Two discs, keyseated to the shaft, drive by means of rollers two weights sliding along a cross bar placed at right angles through the shaft and compressing two springs against two nuts on the same cross bar. Every outside movement of the weights caused by increasing or decreasing the angular velocity of the turbine shaft, is transmitted by means of levers to a sleeve, which actuates the regulating mechanism.

The regulating valve is located below the bed plate. It is connected by a curved pipe with the high pressure front head on one side and with the inlet valve on the other side. It is of the double-seated poppet valve type, with special design, which insures its perfect balance. Valves and valve seats are of tough cast steel to avoid corrosion as much as possible (even for the highest superheated steam). The valve body is made of cast iron and as the expansion of cast steel and cast iron are about the same, all troubles from leaking are avoided.

Immediately below the regulating valve and forming a part of it in one steam chamber, is located the bypass regulating valve. Thus a second stuffing box for the stem of this valve is avoided. The valve has to control the quantity of the steam supply which flows directly to the bypass nozzles in the low pressure front head. It is also of the double-seated poppet valve type. The main regulating valve is not actuated directly by the governor, but by means of the regulating mechanism.

The stem of the regulating valve is driven by means of bevel gears by a shaft which is supported in frictionless roller bearings. On this shaft there is a friction wheel which the governor can slide across the face of a friction disc (which is continually revolving) by means of its sleeve and bell crank lever. The continually revolving friction disc is keyed to a solid shaft which is driven by a coupling from a hollow shaft. This hollow shaft is driven by means of worm gear by the turbine shaft. The solid shaft with the always revolving friction disc can be slightly shifted by the governor sleeve, so that the two friction discs come into contact when the sleeve moves, that is when the angular velocity changes. If this change is relatively great, the sleeve will draw the periodically revolving friction disc far from the center of the always revolving one, and this disc will drive quickly the stem of the regulating valve and regulate the steam flow. So the governor can change the intensity of its actuating. This design avoids the disadvantages of fluctuations which are

especially annoying in indirect regulated water turbines which have a much smaller moment of inertia. As soon as the angular velocity falls below a certain percentage of the normal speed the driving friction disc is drawn back by the governor, the regulating valve remains open and the whole regulating mechanism rests or stops, though the shaft is still running. This is an important feature of the regulating mechanism on account of the fact that the turbine continues to run for ten or twenty minutes after the main inlet valve has been closed.

### Good Showing of the Pullman Co.

The annual report of the Pullman Co. for the fiscal year ended July 31, 1904, submitted by President Robert T. Lincoln at the stockholders' meeting in Chicago, Oct. 14, showed handsome increases in business done and profits realized. The gross earnings from all sources were $24,788,000, an increase of $1,688,000, and were the largest in the history of the company. The net earnings were $9,661,601, or 13 percent on the capital stock of $74,000,000. In the previous year the earnings on stock were $9,417,689, or 12.72 percent. Increased earnings were shown both in the passenger and car building business of the company. Operating expenses were larger but the amount charged off for depreciation was smaller. The company's surplus for the year, after the payment of the 8 percent dividend, was $3,741,600, raising its surplus to $18,017,300 and its net assets to $92,017,300.

At the annual meeting the old directors were re-elected as follows: Marshall Field, O. S. A. Sprague, Robert T. Lincoln and Frank O. Lowden, of Chicago; Henry C. Hulbert, W. K. Vanderbilt, J. Pierpont Morgan, Frederick W. Vanderbilt and W. Seward Webb, of New York; Henry R. Reed, of Boston. The directors will re-elect the retiring officers. The regular quarterly dividend of $2 a share was declared.

The Pittsburg-Buffalo Co., of Pittsburg, has published a book elegantly printed and handsomely bound, giving a large amount of information, statistical and historical, on the coal business in the United States and other countries. In detail it describes the operations of the Pittsburg-Buffalo Co., with portraits of the founder, James Jones, who is at present chairman of the board of directors, and of the other officers of the company. Views are also given of the mines and other properties of the company and of the city of Pittsburg in 1817 and in 1904. The principal officers are: John H. Jones, president; Thomas P. Jones, vice president and general sales agent; William I. Jones, treasurer; David G. Jones, secretary and general manager; J. H. Price, auditor and assistant to the president; Joseph G. Good, traffic manager and superintendent of transportation, and Harry P. Jones and E. F. Miller, directors. The Jones interests since 1878 up to and including 1905 (whose production is estimated at 4,000,000 tons), will have produced 15,701,000 tons of coal.

A test of the new armor plate to be manufactured by the Midvale Steel Co., of Philadelphia, under its government contract, will be made at the naval proving grounds at Indian Head on the Potomac, near Philadelphia, in November. Admiral Mason has received word that the company will then be ready to submit a plate. The plate will be submitted to the fullest test applied to armor before it is accepted by the government, although the sample plate is not an installment on the regular contract. Intense interest is felt in the result of this preliminary test, as it will show what success has been attained by the company in its secret process.

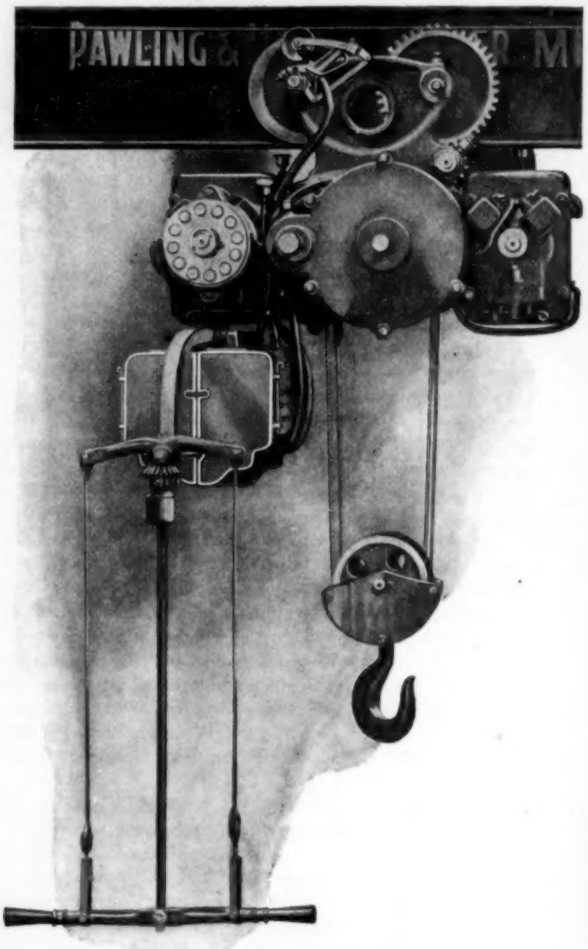
About 18,000 tons of steel rails will be shipped to Corea within the next 30 days by the United States Steel Corporation. Three British vessels have been chartered for the purpose of conveying the material. The steamship Inverness is now loading at Tacoma, Wash., with part of the rails, and the Hero and Quito will carry the balance from the same Pacific Coast port.

The property of the Southern Foundry & Machine Co., Knoxville, Tenn., has been sold at public auction to W. S. Bradley, one of the stockholders, for $16,600.

## AN ELECTRIC HOIST FOR FOUNDRY USE.

The accompanying illustration shows an electric traveling crane designed for the Altoona wheel foundry of the Pennsylvania Railroad, by Pawling & Harnischfeger, Milwaukee, Wis. It will be noticed that the hoist consists of a trolley running on the lower flanges of an eye beam. The hoisting hook is directly below the center of the traveling carriage, so that the load is equally divided between the four wheels. It will also be noticed that the controller and motor are placed on opposite sides of the upper sheave so as to balance each other. The hoist has been made very compact, so that it takes up an exceedingly small amount of head room.

The controller is certainly of unique and interesting construction, and is what is called an outrigger controller, permitting the operator to control both the hoisting and traveling of the carriage with one lever. A turn of the controlling bar in a horizontal plane affects the trolley travel, and the tilting of the same handle actuates the hoisting motor. Both




AN ELECTRIC HOIST FOR FOUNDRY USE.

motors can be reversed by simply changing the direction of movement of the bar. Both the trolley drive and the hoisting motor can be operated simultaneously. The controller connections are so arranged that the motion of one hand is in the same direction as the motion of the machine. For instance, the elevation of the right hand end of the handle bar causes the hook to rise.

The Pennsylvania Railroad is already using one of these hoists and it is the intention to install others for handling flasks and patterns when making car wheels and also to transfer the hot wheels to the annealing furnace with the greatest possible rapidity.

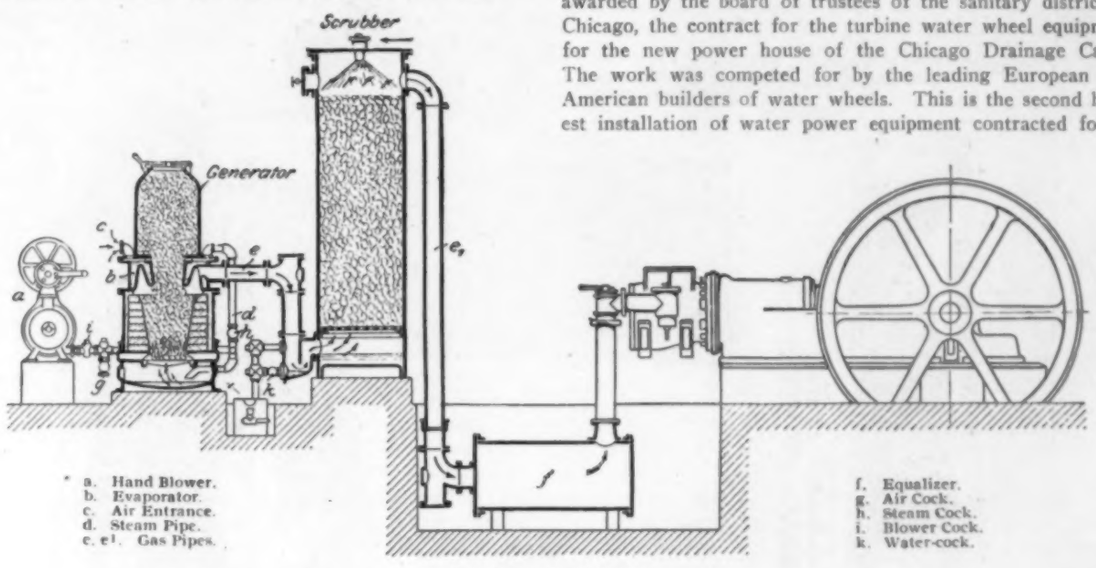
The machine is capable of a maximum trolley travel of 350 feet per minute under full load. The maximum hoisting speed varies from 30 to 50 feet per minute, depending upon whether the hoist is being operated light, or with full load. The hook lift is 11 feet. A direct current 220-volt motor is used. As these hoists must of necessity work in a great amount of dust and dirt the motors and other working parts are entirely enclosed. Each machine is equipped with a load brake and motor brake and a limit switch as safety devices.

## SUCTION GAS PRODUCERS.

Producer gas power plants are built for generating from a suitable material a mixture of carbon monoxide and hydrogen which, if used in gas engines, allows a very advantageous utilization of the fuel. Up to the present time producer gas has been produced by evaporating water in a separate boiler and by leading the steam, mixed with air, by means of a steam jet blower or fan through the glowing fuel, whereby the steam is decomposed to hydrogen and the coal burned to carbon monoxide. This mixture of combustible gases is led through a scrubber to a gas holder and thence to the engine.

In a suction gas producer plant the boiler is supplanted by an evaporator which, in small plants, is built on top of the producer, and in large plants near the producer in the form of a tubular evaporator. This evaporator generates the required steam by utilizing the heat of the producer and of the gases. This is a considerable improvement, as the firing of a separate boiler is avoided and the heat of the gases is employed for generating the necessary amount of steam.

The heat of the gases from the producer is quite sufficient for furnishing such a quantity of steam as is required for the generation of an effective power gas. The utilization of the




A SUCTION GAS PRODUCER.

fuel in suction gas producers is higher than in pressure producers and is claimed to reach 80 percent or more. By leading the steam under the grate the latter is kept cool and clean. The transformation of steam into hydrogen and the formation of carbon-monoxide takes place so quickly that the producer maintains the supply of gas required, and is able to start suddenly from a low up to a full load.

A complete suction gas producer plant consists of a producer, an evaporator, an over flow waterpot, a scrubber and an equalizer (sawdust scrubber). The producer is lined with firebrick. A mixture of air and steam is drawn by the suction of the engine through the burning fuel, generating the producer gas. There is only as much gas made as is required by the engine. The producer is provided with a hopper through which fuel can be fed without interfering with the working of the engine. The cleaning of the grate may be performed during the regular work.

The gas leaving the producer heats up the evaporator and causes a formation of steam which goes under the grate together with the necessary amount of air. From the producer the gas goes through the scrubber in which it is cooled and purified from dust and tar. From the scrubber it goes through a small equalizer.

Before starting the engine the fuel in the producer has to be heated up by means of a small hand blower, a, until the gas is burning well. About ten minutes are required for this work. When this point is reached the hand blower is stopped and the engine started in the usual way.

The engine now draws in the necessary amount of air and produces its own power gas. The air enters at c and goes through the evaporator b. Here it is saturated with steam and the mixture goes through d under the grate of the producer, through the fuel and then through pipe e to the scrubber. From here it passes through pipe e-1 to the equalizing tank f which is directly connected with the engine.

The gas making process continues as long as the engine is moving, but as soon as the engine stops the gas generation ceases.

Anthracite, charcoal or coke can be used equally well for generating gas in the suction gas producer. It will take, according to the ash content, 1 to 1 1-3 lb. of anthracite or charcoal, or 1 1-3 to 1½ lb. of coke for developing 1 h. p. hour. With anthracite (pea) at five dollars per ton, 1 h. p. for 24 hours will cost from 6 to 8 cents. This is about one-sixth the cost of illuminating gas power (at 75 cents per 1,000 cubic feet of illuminating gas), or one-eighth the cost of gasoline (at 16 cents per gallon).

These plants are built by Oskar Nagel, of 90 Wall street, New York, in units from 5 to 300 h. p.

## Large Turbine Water Wheel Contract.

The Wellman-Seaver-Morgan Co., Cleveland, has been awarded by the board of trustees of the sanitary district of Chicago, the contract for the turbine water wheel equipment for the new power house of the Chicago Drainage Canal. The work was competed for by the leading European and American builders of water wheels. This is the second largest installation of water power equipment contracted for in the United States, the largest single water power equipment previously contracted for being the one also built by the Wellman-Seaver-Morgan Co., at Sault Ste. Marie, Mich., for the power house of the Lake Superior Power Co., to consist when completed of 50,000 h. p. The Chicago Drainage Canal power station, which is to be located near Joliet, will be the most complete and up-to-date plant in the United States, and a model of its kind in every detail. The equipment will comprise four 6,000-h. p. units of turbine wheels, which will be direct connected to electric generators. There are also two exciter units of 600 h. p. each included. The contract will require about one year for completion.

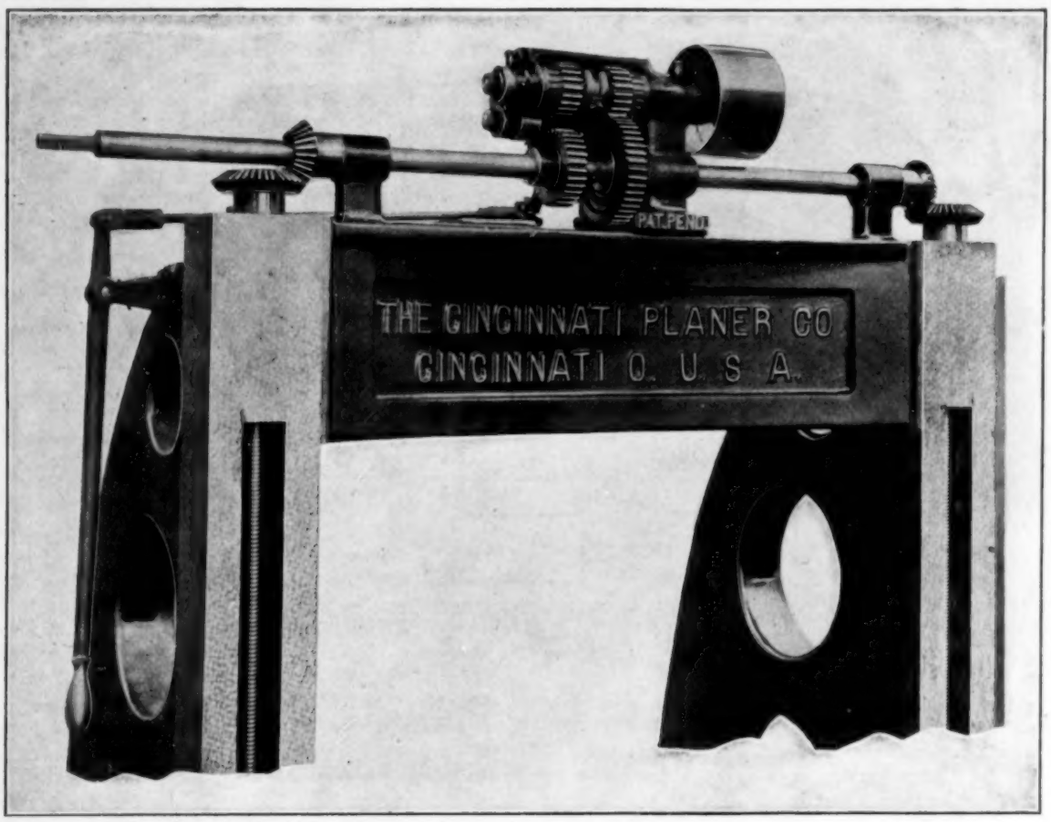
Mayor Howard H. Houston, of Chester, Pa., and James A. G. Campbell, president of the Delaware County Trust Co., have been appointed receivers for the Delaware River Steel Casting Co., of Chester, Pa. The plant for which the receiver has been asked has been in operation only a year and has been looked upon as one of the busiest industries along the Delaware river. The capital is $500,000. The Real Estate Trust Co., of Philadelphia, holds a mortgage of $300,000, and bonds have been issued to the amount of $146,400. The equity bill states that the bills payable of the concern amount to $87,500; that the property and tools are worth $125,000, and the personal property and the bills receivable are $12,000. The court was of the opinion that the concern was insolvent at least in $50,000. President Goodman, of the company, opposed the application and asked the Court to give him time to straighten out the concern.

## A NEW POWER ELEVATING DEVICE FOR PLANERS.

The illustration shows a new patented elevating device for planers which the Cincinnati Planer Co., of Cincinnati, is applying to its machines. The improvement has a number of advantages over the mechanism it supplants and makes a very good appearance compared to the old tumbler gearing.

The new arrangement is operated by friction rings and is noiseless as well as subject to very little wear. The mechanism is located compactly on the arch so as to bring the large gear which raises the rail, exactly in the center of the machine and any torsion of the elevating shaft will be distributed equally on each side. The elevating shaft is increased in diameter and a third bearing is provided close to the large lifting gear to take care of any spring or side thrust that may be occasioned by the gearing strains.

The two gears on the right are employed for raising the rail and the three gears on the left are for lowering purposes. It will be readily seen that the raising gear is much larger in diameter than the gear used for lowering the rail. The design gives a slow speed and plenty of power for handling the weight of the rail. The lowering gear being smaller in diameter gives one-third higher speed while letting down the rail at a time when practically no power is required, the gearing simply checking the falling weight. Attention is directed to the fact that when the device is not in use all the gears are idle, the shaft and the attached pulley being the only rotating parts.




POWER ELEVATING DEVICE FOR PLANERS.

The device is engaged and disengaged by a long handle shown at the side of the hoisting and this lever is brought down within easy reach of the operator. The shifter lever is held in a fixed position by a locking screw when it is not in use. The extreme length of the handle gives a long leverage for working the taper counter wedges and allows the workman full control of the rail movement. The complete control that the operator has over the rail permits him to raise or lower it to closely match a scratched line on the housing.

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The Buckeye National Bank, of Findlay, O., has sold the plant of the defunct Ohio Rolling Mill to J. E. Klein and H. Gettinger, of Galion, O., who will dispose of the equipment.

## VIRGINIA IRON, COAL & COKE CO'S REPORT.

President Henry K. McHarg, of the Virginia Iron, Coal & Coke Co., in his report for the fiscal year ended June 30, 1904, last refers to the continued depression in iron, coal and coke, which has made it very difficult for the company to operate the property successfully and earn anything more than the operating expenses. The net earnings from all sources for the first six months of the year, after setting aside interest on bonded debt were about $92,000. Since Jan. 1, 1904, the deficiency from month to month under interest, taxes and expenses has been about $122,000. Deducting the $92,000 standing to the credit of the company up to Jan. 1, 1904, shows it has run behind approximately $30,000 for the year's operations. The company had on hand July 1, 1904, pig iron valued at $644,533, none of which has been pledged for any loans and no cash borrowed on the same. The net earnings of the company for the 15 months prior to June 30, 1903, nine months of which was during the receivership, were $1,480,000, or more than four years' interest on its bonded debt now existing. Although the price of iron reached the figure of $24 or $25 for prompt shipment at times, during this fifteen months the average price received for the company's iron was $16.15 per ton. The outstanding bonds of the company on June 30, 1904, were $6,991,000. All prior liens ahead of the Virginia Iron, Coal & Coke Co. first mortgage 5 percent bonds, with the exception of $557,000 of Carter Coal & Iron Co. bonds, have been paid. The reduction in the bonded debt in the past year has been $609,000.

President McHarg states that the Bristol furnace has received repairs and the plant is in good condition and ready to start up at any moment. The two Middlesboro furnaces will be ready to blow up about November 1, and the same statement applies to the Crozer furnaces. Liberal expenditures for improvements have been made, and it is expected that the company will be able to make cheaper iron than ever before. The Virginia & Southwestern Railway Co. reports for the year ended June 30 a surplus over all charges of $62,575.

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The manager of the Jeffersonville, Ind., plant of the American Car & Foundry Co., has received orders to close the plant for an indefinite period.

## THE MANUFACTURE OF COKE IN PERU.*

BY J. MORGAN CLEMENTS, NEW YORK.

The manufacture of coke in Peru, as practiced at the coal mines of the Quishuarcancha and Goyllarisquisca districts, is intermediate between the primitive coke heap and the beehive oven. The method of coking is quite simple. In constructing the coal heap, preparatory to burning, the ground is first leveled, and a simple stack of stone and clay is built, giving the bottom, to a height of 6 ft., approximately 6 ft. of external diameter. The size of the stack varies in different districts, but is generally 9 ft. high, and slightly smaller at the top than at the bottom. The walls of the heap are from 12 to 14 in. thick, which allows an inside diameter of from 3.25 to 4 ft. These walls are pierced at intervals by three or more tiers of openings or flues, connected with the central flue. The radial flues have a diameter of about 5 in. and are built with a gentle upward slope. The stack is permanent; and in this respect the practice in Peru differs from other primitive practices in which nothing is permanent except the yard.

Above the permanent 6-ft. portion of the stack there is added a cap of clay, about 3 ft. high, which contracts toward the top, where it has an inside diameter of about 2 ft. This clay cap is temporary, and frequently has to be renewed after each burning.

Before charging the coal, there are first built, from the lowest tier of flues upon the ground, a number of temporary flues, leading from the central stack out to the edge of the coal heap, and constructed of blocks of coal for the greater part of the distance, the outer edge alone being of rough stone. The coal is then piled up over these flues and around the stack to a height of about 6 ft. The bottom flues are the only ones that extend to the periphery. The heap, about 20 ft. in diameter, contains about 24 short tons of coal.

The coal is ignited by means of small fires built at the ends of the flues at the base of the heap, and from these the combustion gradually extends throughout the entire heap. About 10 days are required for coking, and 12 tons of a fair grade of coke are obtained. A good deal of ash accumulates upon the top of the pile and around the flues resulting from the burning of the coal with free access of air. In some cases the practice is modified slightly by spreading a layer of sod over the heap, which partially excludes the air from the surface. The columns of coke are vertical or generally normal to the surface of the heap, and from 12 to 18 in. long. The coke produced in this crude way has a silvery luster, good structure, and is fairly strong; but, by reason of the method of burning, as well as to the character of the coal used, the percentage of ash is high.

*Read at the Lake Superior meeting of the American Institute of Mining Engineers.

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In an interview relative to the notice posted by the American Locomotive Co. at Schenectady, N. Y., that the force would be reduced, W. L. Reid, superintendent of the company, said: "We are now experiencing one of those periods of depression to which the country is subject periodically. I do not mean to infer that the depression is serious, but that there is a sufficient falling off in orders to make it necessary for us to reduce our force. Besides, we are oversupplied with help, and it is necessary that the excess be gotten rid of. There will be no sudden or large reduction of employes. We want the men to keep busy elsewhere, if they cannot find the employment they want here, so we are telling them that as orders are falling off and the prospects are not good for their increase, it will be well for them to find employment elsewhere." When asked if the discharge of the contractors meant the elimination of the contract system and the substitution of the day's work system, Mr. Reid said: "Not at all. There is no intention of making any change in that respect. It simply means that orders are falling off, that prospacts are not favorable, and we have more men on the payroll than there is work for. No, the presidential campaign has absolutely nothing to do with it. It is only one of those periodical times of depression which are likely to be experienced in any business."

## PERSONAL.

J. H. Hamilton, who has been for seven years the general sales agent of the Dillon-Griswold Wire Mill Co., Sterling, Ill., has tendered his resignation to accept a position with the Pittsburg Steel Co., Pittsburg.

Henry E. Pridmore, Chicago, who has been in Europe for the past month on a vacation, sailed for the United States from Queenstown, Oct. 11 on the Cunard steamer "Ivernia."

W. P. Johnson, cashier of the Commercial National Bank, Cleveland, has been elected a director and vice president of the Empire Rolling Mill Co., of that city, to fill a vacancy caused by the recent death of Col. W. J. Morgan.

Harry Nuttall, superintendent of the Mark Mfg. Co.'s tube mill, at Zanesville, O., has resigned.

At the annual meeting of the stockholders of the Union Pacific railroad held in San Francisco, last week, H. C. Frick, of Pittsburg, was elected one of the directors to succeed L. Fitzgerald.

W. H. Packer, superintendent of the 48-in. mill at the Homestead Steel Works of the Carnegie Steel Co., Pittsburg, has resigned to accept the position of general superintendent of the mills of the National Tube Co., at Lorain, O.

Stephen A. Harrington, president of the Harrington & King Perforating Co., Chicago, was married Monday evening, Oct. 17, to Miss Georgina Richey. The bride and groom have left for a six weeks' trip in the East.

James W. Downer has been appointed general manager of sales of the National Tube Co., Pittsburg, having in charge the details of the general sales office and reporting to Edward Worcester, first vice president of the company and who has been also general manager of sales for several years. Mr. Downer has been connected with the National Tube Works and the National Tube Co. for the past twenty years, and during the last eight years was in charge of the foreign department. His office will be in the Frick building, Pittsburg, where the headquarters of the National Tube Co. are located.

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## Obituary.

Thomas M. Pollock, a well known furnace man of the Mahoning valley, died Oct. 13 at his home, in Youngstown, after an illness of about a year. He was in his 66th year. Mr. Pollock was born in Pittsburg. At Youngstown in his 16th year he accepted a position with the Phoenix Furnace Co. At 21 he was made general manager of the Phoenix Furnace Co. In 1861 he resigned to accept a similar position with the Eagle furnace. He was very successful as a manager. In 1884 he entered the employ of the Brier Hill Iron & Coal Co. He was compelled to give up work on account of ill health, and after a long sojourn in the West returned and took charge of the blast furnace department of the Youngstown Steel Co. His health again failed and he was compelled to retire from active work.

Carl Ernst Bertrand, inventor with E. T. Thiel of the Bertrand-Thiel steel process, died at Kladno, Bohemia, Oct. 7. After obtaining a thorough technical education in Germany Mr. Bertrand entered the Teplitzerwalzwerk as an under chemist, and through persistent efforts became the head of the works. He afterwards associated himself with the Kladno Eisenwerk and became the head director and principal stockholder.

Elkanah Lane, president of the Lane Tool Co., Cleveland, died suddenly Oct. 14, aged 69. Mr. Lane was born in Swansey, N. H., and interment was made at his birthplace. He had lived in Cleveland twenty-two years. In 1890 he founded the Lane Tool Co., of which his son, Frederick E., is secretary and treasurer.

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The non-stop runs of automobiles and motors are very popular undertakings abroad and the attempts to make extended trips of the cars with continuous movement of the engines results in rather interesting records. The latest account is credited to a 15-h. p. car of the Darracq type, which covered 2,390 miles in 204 hours, and during this period the engine was running continuously.

# THE IRON TRADE REVIEW

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OCTOBER 20, 1904


## RAILROAD CONSUMPTION OF STEEL.

The enormous expenditures which the railroads of the United States have before them are hardly appreciated, for the reason that such outlays are now for improvements rather than for extensions. Those who take a superficial view of the situation hark back to the great period of railroad building, when in the three years from 1886 to 1888 there was an increase of 28,000 miles in the railroad mileage, and to an earlier period, the four years 1880 to 1883, when the increase was 35,000 miles. These two periods showed an average increase of about 9,000 miles annually. In the past five years of a certainly satisfactory condition of prosperity our railroad mileage has been increasing at the rate of only a trifle over 4,000 miles per year. These figures prove absolutely nothing as to iron and steel consumption, even as regards rails. When railroad mileage was increasing at the rate of 9,000 miles annually, the railroads were buying less than 1,700,000 tons of rails per year, including iron rails and imported rails. Now, with railroad mileage increasing at less than half the former rate, railroads are buying more than half again the rail tonnage. Some are still replacing iron rails with steel rails; others are replacing steel rails because the previous sections were too light or because they are worn out. There is still iron track in the country which would require 2,000,000 tons of 85-pound rails to replace.

All this, however, is but a comparatively minor feature. Of over a million and a half freight cars in operation on the public railroads, considerably less than a tenth are all-steel, or even have steel underframing. The present time in the iron trade is not one of extensive forward booking, or even of very great activity on current business, yet the steel car builders have orders on books which will keep them busy for the next three months. Even the casual observer notes that the locomotives on our standard roads represent different types from those which were in service on them fifteen, or even ten, years ago. Many of these older locomotives have not been scrapped, but can still be found, if one goes to the right part of the country to look for them. Ultimately they will be replaced by more modern types.

Here and there one can find magnificent stretches of railroad, with three or four tracks as perfect as human hands can make them, and served with automatic block signals. They simply denote the possibilities. Of 200,000 miles of railroad in the United States only a comparatively few thousand miles are equipped with automatic signals. Indeed, automatic signals are impracticable on the bulk of the railroads of the country, since only three-eighths of the total mileage is double track. Although on some roads freight trains carrying a thousand tons of freight apiece run only a mile apart, on other roads trains carrying only one or two hundred tons struggle along at intervals of hours. One road carries regularly over 1,500 tons of freight per loaded train, and over 1,000 tons per train including empties, while the average train load of the country is only 308 tons.

These variations occur because not simply the poorest, but the average, railroad falls so far short of the best. The regions they serve have not yet been developed. One of the striking changes which the past decade has made in industrial and financial affairs has been the lessened regard which capital pays to geographical limits. The older political economists discussed the "disinclination of capital to emigrate" and some even ventured to express the disinclination in percent. If such expression were really practicable, the percentage would show a great reduction in the last ten years, and this will make for the development of the country traversed by the more poorly equipped roads. Then the general railroad amalgamation wholly eliminates the disinclination as regards a large class of improvements. The management of a great railroad system is as near one mile of its track as it it to another. Geographical distance from headquarters has nothing to do with its devoting funds to improvements.

The opinion expressed some time ago by one of our great railroad presidents, that the large railroads could no longer hope to depend upon surplus earnings for all their improvements, should not be taken as grounds for a conclusion that the necessary development of the country's railroads, taken as a whole, must depend entirely or even largely upon the flotation of additional securities. This opinion was not intended to apply to roads which are in a comparatively early state of development, yet these roads constitute the bulk of the country's railroad mileage. Freight revenue has fallen in twenty years from about 1¼ cents per ton mile to about ¾ cent per ton-mile, yet the present rates, which are not likely to fall materially in the next few years, are so remunerative that the average dividend rate on railroad securities is the greatest within the range of comparable statistics, and would be very much more profitable if based on economics in practice which have been shown feasible. Indeed, the possibilities of cheap freight haulage have hardly been exploited at all, if one gives the weight it should command to the recent statement of James J. Hill, that he could build a railroad, on modern scientific lines, not carrying passengers, which would put out of business any free waterway having less than 20 feet depth.

When the bulk of our railroads are double tracked with 85 or 100-pound nickel steel rails, laid on steel ties, permitting and carrying a reasonable density of traffic with modern locomotives and steel freight cars,

the railroads of the country will have really been developed, and there will be represented an iron and steel consumption which will make the consumption hitherto appear insignificant. That time is really not very far distant.

## CRUCIBLE STEEL CO. OF AMERICA.

(Special Telegram.)

NEW YORK, Oct. 19.—The annual meeting of the stockholders of the Crucible Steel Co. of America was held in Jersey City today. The annual report for the year ending August 31, 1904, shows net earnings amounting to only $488,160.33, as compared with $1,522,550.27 the previous year and $3,552,467.94 for the year ending Aug. 31, 1902. The total loss incurred in the construction, operation and sale of the Clairton Steel Co. amounted to $3,997,426.40 on Sept. 1. The stockholders are asked to sanction the sale of $7,000,000 first mortgage five percent bonds.

The report is in part as follows: "The net earnings for the year amount to $488,160.33. This result is shown after charging off the following items: Amounts receivable (doubtful and disputed), $65,553.59; depreciation in inventory, $695,640.00; total $761,193.59. The reduced earnings shown may be attributed largely to the heavy decline in prices of pig iron, billets, scrap and other materials entering into the manufacture of steel and to the corresponding reduction in prices at which we were obliged to market our product sold on competitive lines, as well as the decrease in the volume of business generally, there being periods during the year when we were obliged to partially and in some cases wholly close down some of our mills.

"On Sept. 1, 1903, a period which witnessed the beginning of a dull year in manufacturing lines, carrying with it constantly decreasing values, we had on hand an unusually large stock. The necessity of keeping the Clairton plant in full operation compelled this company to take from the Clairton Steel Co. its surplus product, and we gave them orders accordingly, which we would not have done with an outside concern. This material was charged to and inventoried by us at the high market prices prevailing at that time. This of course seriously affected the profits, during the earlier months of the year and until this stock was exhausted.

"In placing figures of value on the inventory, we endeavored as nearly as possible to make a relative reduction over the previous year, consistent with the market prices and cost of production, and in order that the values might be unquestionably safe a further considerable reduction was made on all finished stock on hand. This places the finished product at a lower valuation than it has been at any time during the existence of the company.

"We have disposed of the capital stock of the Consumers' Heating Co., for $50,000. This company was a producer and conveyor of natural gas and during the past few years the supply had been steadily decreasing. The sale resulted in a loss to the company of $81,494.42, which has been charged to profit and loss. The company has also charged off the sum of $200,000 upon its investment in the Canton Steel Co.'s stock. During the year the officers of the company have been authorized to write off the losses incurred in the construction, operation and sale of the Clairton Steel Co., to Sept. 1, 1904, amounting to $3,997,426.40. Full particulars concerning the same have already been submitted to you through the statement issued by Chairman Wm. G. Park under date of Sept. 20, 1904. Your attention, however, is called to the fact that the total loss shown in the statement made by Chairman Park is $4,013,417.90. This difference is due to the fact that this report is made as of Aug. 31, 1904, at which date the exact amount of certain items of loss had not been definitely ascertained.

"Betterments made during the year amount to $110,038.06. You are asked at this meeting to authorize an issue of $7,000,000 first mortgage 5 percent bonds to be issued in series, one of which will mature (after five years) annually during twenty years, these bonds to be secured by mortgage upon all the property and franchises of the company. The objects of the issuing of these bonds are as follows:

"1. The retirement of the $5,000,000 short time 6 percent collateral trust bonds issued Oct. 21, 1903.

"2. The cancellation of the bills payable of your company aggregating $940,187.03.

"3. To purchase the outstanding stock of the Park Steel Co. amounting to $235,100 par value.

4. To provide for future developments and betterment.

"It is the purpose of the board of directors to dispose of these bonds from time to time as the needs of the company may require, at not less than 95 net, over and above all expenses and commissions, the stockholders to have the first right to subscribe. In the month of September the volume of business was equal only to the average of the past year, but so far the month of October shows considerable improvement. Orders are coming in much more freely and we look for a steady gain both in amount of sales and profit."

The total debits of profit and loss account are $4,282,484.59. The credits are a surplus of $1,638,691.91 on Aug. 31, 1903, and earnings of $488,160.33 for the last fiscal year, the total credits being $2,126,852.24.

The statement of assets shows accounts receivable of $1,581,773.67; amount due from Canton Steel Co., $401,189.39; bills receivable, $205,349.67; cash, $1,201,469.32; inventory, $5,814,344.39; amount due from Park Steel Co., $203,791.57. The statement of liabilities includes the following: Notes in settlement of Clairton Steel Co.'s accounts, $455,537.17; Park Steel Co. notes, $35,316.53; notes for purchase of Park Steel Co. stock, $370,000; notes given Clairton Steel Co., $1,725,000; Canton Steel Co. notes endorsed, $455,000; Crucible Steel Co. notes, $140,000; Park Steel Co. notes, $210,000; collateral trust bonds sold, $1,600,000.

The value of real estate plant and equipment is put at $42,672,306.67; betterments, $110,038.06, and the company holds among its assets the following stocks and bonds: Crucible Steel stock, $985,100; Central Plow Steel Co. stock, $25,000; Park Steel Co. preferred stock, $370,312.57; Canton Steel Co. stock, $100,610; Portsmouth Iron & Steel Co. mortgage, $180,000; Cumberland Steel Co. mortgage, $32,500; miscellaneous stocks, $4,290; U. S. Steel Corporation 5 percent bonds, $160,000.

James H. Park, Julius Bieler and Alexander Thomas were re-elected to the board of directors for term expiring 1907, and J. D. Lyon was elected on the board to succeed W. P. Snyder, who was president of the Clairton Steel Co.

## Additional Orders for Vessels.

Orders for new ships are still coming in. The American Shipbuilding Co. has closed contracts for two more large freight steamers, making orders for 10 modern vessels that the company has announced up to date. The last two boats ordered are for G. A. Tomlinson, of Duluth. They will cost $360,000 each, and will be 524 ft. over all, 54 ft. beam and 30 ft. deep. The West Bay City yard, which has been idle for some time, will be opened at once and work on the new boats will be started as soon as the new material arrives at the shipyard. This company will build four steamers at Lorain, two at Detroit and four at Cleveland. The Great Lakes Engineering Works, Detroit, has closed a contract for a big freighter for the Cleveland Cliffs Iron Co. The dimensions of the new boat have not been decided upon, but she will be a 9,000 or 10,000 ton steamer. If it is decided to build a boat of 9,000 tons capacity she will be 504 feet keel and 54 beam, and in case a 10,000 ton boat is built she will be the widest freighter on the lakes. She will be 514 feet keel and 60 feet beam, which will make her four feet wider than the steamer Augustus B. Wolvin which holds all lake cargo records. The contract price was not given out. The Detroit company is also figuring on another freighter which will probably be built for Cleveland interests. The Craig Shipbuilding Co. of Toledo, has secured a contract to build a lighthouse tender for the government. She will be a fast steaming boat and will be christened Aspen. The price is $69,750. This vessel will be the first government boat to be built at the Toledo yard.

# The Labor Situation.

### THE MOLDERS STRIKE AT CINCINNATI.

The National Foundrymen's Association and the Cincinnati Employers' Association are making good progress in the molders' strike at Cincinnati and now have enough men to equip four of the foundries with a full force, while the rest of the foundries have from one-third to one-half their full number at work. These forces are being added to daily and indications are that quite an increase in the number of men at work will be made this week.

### METAL TRADES ASSOCIATION NOTES.

A meeting of the Plan and Scope committee of the N. M. T. A. will be held in Cincinnati on Oct. 25 and 26. This committee is composed of W. D. Sayle, O. B. Kinnard, A. Faulkenau, C. E. Hildreth and F. K. Copeland. Accommodations have been arranged for the committee at the St. Nicholas Hotel by the Commissioner.

The Administrative Council of the N. M. T. A. meets in Cincinnati on Oct. 27, 28, and 29. The following persons comprise the council: President, H. N. Covell, Lidgerwood Manufacturing Co., Brooklyn, N. Y.; First Vice-President, J. W. Gardner, Gardner Governor Co., Quincy, Ill.; Second Vice-President, W. D. Sayle, Cleveland Punch & Shear Wks. Co., Cleveland; treasurer, F. A. Geier, Cincinnati Milling Machine Co., Cincinnati; commissioner, W. P. Eagan, Cincinnati; secretary, Robert Wuest, Cincinnati; F. B. Polson, Polson Iron Works, Toronto, Ont.; O. B. Kinnard, Kinnard-Haines Co., Minneapolis, Minn.; A. Faulkenau, Faulkenau-Sinclair Machine, Philadelphia; C. E. Hildreth, P. Blaisdell & Co., Worcester, Mass.; G. F. Steedman, Curtis & Co., St. Louis; M. H. Barker, American Tool & Machine Co., Boston; P. B. Kendig, Seneca Falls Manufacturing Co., Seneca Falls, N. Y.; F. K. Copeland, Sullivan Machinery Co., Chicago. Business of vital importance will come up at these meetings and a full attendance is expected. The Plan and Scope committee at its meeting two days previous to the council meeting will prepare a report to be read at the council meeting.

It is reported from Springfield, Mass., that the association is still growing. Quite a number of new members were elected at the October meeting, among them some of the most important business houses in the city.

An attempt is being made on the part of the pattern makers' union of Milwaukee to establish a new rate of 38 cents per hour. They have succeeded in getting one or two of the small shops to pay it. From what can be learned the union is very strong in Milwaukee and very few of the craft are outside of the union.

The Chicago lodge of the International Association of Machinists, District No. 8, has sent out an appeal to all officers and members of local lodges of machinists everywhere for financial assistance. One paragraph reads as follows: "Our members working in this city have paid heavy assessments in the past four years and they are now paying weekly assessments to keep up the fight; but our court expenses are so great that we are compelled to ask for aid. We have strikes on in 32 shops and have just that number of injunctions against us at this time, our members are being arrested daily, and we have 138 cited for contempt of court. While we claim we are only doing our duty as law abiding citizens, we are compelled to protect our members when they are molested by the special officers employed by the Employers' Association.' This letter also says that there are about 1,000 machinists now on strike in Chicago, and about 1,000 more who were out of work before the strike, making 2,000 men to provide for at this time, which is no small matter.

As the result of a recent investigation made by the New England conference board of the I. M. U., respecting labor conditions in thirty of the principal New England manufacturing cities, it appears that 3,030 molders are employed in shops, of which 86 are union shops and 56 are open shops. Of the latter 16 are designated as "scab shops."

About 1,200 employes of the Passaic Steel Co. who have been out on strike against a reduction in wages ranging from 10 to 20 percent, have accepted the reduction and returned to work.

The Worcester, Mass., molders' strike seems to be proceeding smoothly and all the shops are running full handed. Hutt, a union molder, who assaulted a non-union man several days ago, was arrested and punished by commitment for six months, but he was bailed out in a recognizance of $200, awaiting the superior court.

On Tuesday, Oct. 11, a dinner was given at the Bay State House, Worcester, Mass., by the Worcester Metal Trades Association with nearly all the firms of the association represented and quite a number of their business friends. W. P. Eagan, commissioner of the National Metal Trades Association, was the principal speaker. He took the opportunity to thank the local association for its assistance to the N. M. T. A. and stated that he believed local associations and labor bureaus were fixtures which had come to stay, but he felt that the greatest good was to be derived by the co-operation of the membership in the National and local associations. Others who spoke generally upon the subject of local and national associations were: Chas. E. Hildreth, E. M. Woodward, A. M. Powell, Paul B. Morgan, Frank L. Coes, A. W. Whitcomb, Enoch Earle, J. P. Coghlin and H. G. Barr.

### LABOR NOTES.

The Chicago & Erie railroad has re-opened its shops at Huntington, Ind. Striking boilermakers have removed their tools and men have been employed to take their places.

Steel workers employed in the rail and plate departments of the Illinois Steel Co.'s plant at South Chicago have been notified that when the present agreement expires Jan. 1 it will not be renewed. The workmen understand this to mean that they will be asked to accept the same reduction of wages and the same length of hours recently adopted at the company's plant at Joliet.

On account of the recent advance in the price of pig iron, the Tennessee Coal, Iron & Railroad Co., the Sloss-Sheffield Steel & Iron Co. and the Tutwiler Coal, Iron & Railroad Co., which have been operating open shop mines since the recent strike, have granted an advance of 2½ cents per ton in the wages of their coal miners.

The Amalgamated Association of Iron, Steel and Tin Workers has declared open the Star and Monongahela tin plate plants of the American Sheet & Tin Plate Co. Both mills are operated non-union, and owing to the idleness of a large number of tin workers affiliated with the Association, this step was taken to give them a better opportunity of securing employment.

## Friction of Sliding Keys.

Some recently published experiments on the friction of sliding keys show a pronounced difference between the effect produced by one feather sliding through a clutch and two keys arranged diametrically opposite each other. A model was constructed in which the vertical shaft was 1½ in. diameter with two keys, one being permanently fixed in position and the other attached by countersunk screws. A bushing bored to a sliding fit on the shaft was also splined to match the keys and was subjected to a twisting couple from two equal weights suspended from pulleys and connected by cords to the bushing. These cords tended to turn the bushing around the shaft and press the keyways sidewise against the keys. Another cord led up from the bushing and passing over a pulley enabled the weight to be balanced or exceeded in order to measure the relative friction of the single or double key construction. The experimenter asserts that with this apparatus it was shown that the two keys in place required a 3-lb. weight to slide the bushing up the shaft and that with but one key 5 lb. were needed. The frictional resistance of a clutch with two keys was determined from a number of experiments to be but 60 percent of that met when but one key was used. A correspondent in *Engineering* states that he has applied this second key to some very large sliding clutches of the claw-tooth type and that where these had formerly broken down—by failure of the automatic levers by which they were operated—the second key had made a satisfactory improvement.

The Standard Wheel Co. will rebuild at once the main building of its plant at Memphis, Tenn., recently destroyed by fire. The general offices of the company are at Terre Haute, Ind.

## REPUBLIC IRON & STEEL CO.'S REPORT.

The annual meeting of the Republic Iron & Steel Co. was held in New York Oct. 19. The report for the year ending June 30, 1904, indicates a net loss of $254,188, but present prospects are most encouraging. The profit and loss account is as follows:

PROFIT AND LOSS ACCOUNT.
For the Year Ending June 30, 1904.

| | | |
|---|---|---|
| Profit from the business of the Company, after deducting all expenses, excepting improvements, renewals and repairs | | $1,306,068 05 |
| Less Depreciation: | | |
| Including amounts expended during the year for reconstruction, renewals and repairs | $ 890,640 07 | |
| Amount written off for depreciation of inventories | 669,616 41 | 1,560,256 48 |
| Net loss during year | | $ 254,188 43 |
| Surplus June 30, 1903 | $3,248,206 28 | |
| Net loss during year | 254,188 43 | |
| | $2,994,017 85 | |
| Deduct quarterly dividend of 1¼% on preferred stock, paid Oct. 1, 1903 | 357,295 75 | |
| Surplus on books June 30, 1904 | | $2,636,722 10 |

President Thompson, under date of Oct. 7, says:

"The past year witnessed a depression in the iron and steel industry of unusual severity. In the early part of November, 1903, the price of steel declined $6 per ton, demand for iron and steel products diminished, and production was reduced nearly 40 percent. At the end of the first half of the year, general conditions were such that it was deemed prudent to adjust our inventory values, and $669,616.41 was written off, thereby reducing stocks of raw and finished materials to figures considerably less than those at which they could be replaced. On the other hand, cost of production increased as the diminished demand prevented some of our works from operating full time, and entirely suspended operations at others, and an extremely severe and long winter further increased the cost of production by increasing cost of fuel, and the amount of labor required. At the beginning of March, however, the volume of business began to increase and our operations have since been profitable. Today the outlook is again very encouraging.

"The amount expended during the year for new construction was smaller than in any year since the organization of the company. This work consisted chiefly in the installation of new converters and a new 40-in. mill at our steel plant in Youngstown and increasing the capacity of our furnaces, coking and mining plants at Birmingham. This new work was absolutely necessary to reduce the cost of production to the lowest possible point. All new construction work which was contracted for is now completed. By rigid economy and a quite general reduction of salaries the fixed charges have been reduced as far as possible without bringing about the disorganization of an efficient working force.

"An interesting, and perhaps important, factor in the future of the company may be found in its oil operations. At the time of the organization of the company, and later, it acquired gas and oil leases on 18,000 of land, for the purpose of supplying the Muncie mills with natural gas. As the gas pressure diminished, production of oil increased. The total oil production in 1903 was 35,107 barrels. In the first six months of 1904 it was 27,913 barrels; in the month of September, 1904, it was 41,885 barrels. Present production averages over 1,400 barrels per day. While it is too early to form a proper estimate of the value of our oil property, we feel justified in carrying on vigorous development work. We now have seventy-one producing wells and are engaged in drilling seventeen more.

"The company has recently completed its financial arrangements, which have been under negotiations for some time, through the First National Bank and the First Trust & Savings Bank, both of Chicago. The company will issue $10,000,000 first mortgage bonds, protected by a sinking fund which will form the collateral security for a loan of $7,000,000 on its two and three-year notes. The bonds will be deposited for the benefit of those who purchase these notes, with the First Trust & Savings Bank, which institution is also trustee under the mortgage. A sufficient amount of these two and three-year notes has already been sold to take care of the company's floating indebtedness and to provide for all its present requirements. The balance will be placed when and as the company requires the money. There will be no public subscription. It has not yet been determined whether the bonds will ultimately be sold or the notes liquidated from the earnings of the company, which, with the revival of the steel business, promise to be large.

"A short time ago a committee of leading experts examined into the ore and coal properties of the Republic Iron & Steel Co. in the Birmingham district. Coming from such an authoritative source and being based upon a careful examination of the properties, we deem their report to be of sufficient importance for submission to our stockholders. It shows conclusively, that our holdings of ore and coal in that district are abundant to supply our Southern furnaces for more than fifty years.

"With a tonnage of orders on our books at this date, engaging the capacity of our plants now in operation for the balance of the year, and operating at much lower costs than ever before, due to the new construction work now completed, we look for favorable results in the immediate future."

GROSS SALES AND PROFITS.
From May 1, 1899, to June 30, 1904.

| PERIOD | GROSS SALES | GROSS PROFITS | DEPRECIATION | NET PROFITS | DIVIDENDS | AMOUNT CARRIED TO SURPLUS |
|---|---|---|---|---|---|---|
| May 1, 1899, to June 30, 1900 | $ 35,900,244 73 | $ 5,684,100 87 | $2,040,371 95 | $3,643,728 92 | $1,421,679 00 | $2,222,049 02 |
| July 1, 1900, to June 30, 1901 | 15,984,829 89 | 1,034,248 31 | 725,149 55 | 309,098 76 | 1,421,483 00 | *1,112,384 24 |
| July 1, 1901, to June 30, 1902 | 24,430,679 95 | 3,260,076 49 | 1,011,245 02 | 2,248,831 47 | 1,424,108 00 | 824,723 47 |
| July 1, 1902, to June 30, 1903 | 25,647,170 27 | 4,123,500 16 | 1,382,600 03 | 2,740,900 13 | 1,427,083 00 | 1,313,817 13 |
| July 1, 1903, to June 30, 1904 | 17,242,569 38 | 1,306,068 05 | 1,560,256 48 | *254,188 43 | 357,295 75 | *611,484 18 |
| | $119,205,494 22 | $15,407,993 88 | $6,719,623 03 | $8,688,370 85 | $6,051,648 75 | $2,636,722 10 |

*Loss or Deduction.

BALANCE SHEET.
June 30, 1904.

| | | | |
|---|---|---|---|
| ASSETS: | | | |
| Real estate, plants, buildings, machinery and other permanent investments | | | $40,706,398 82 |
| New Construction: | | | |
| May 1, 1899 to June 30, 1900 | $1,218,203 44 | | |
| July 1, 1900 to June 30, 1901 | 1,164,175 26 | | |
| July 1, 1901 to June 30, 1902 | 2,003,183 95 | | |
| July 1, 1902 to June 30, 1903 | 1,681,040 32 | | |
| July 1, 1903 to June 30, 1904 | 457,985 87 | | |
| | | 6,524,588 84 | |
| Stock in Sundry Companies at cost | | | 538,538 07 |
| Producing oil and gas wells, pipe lines and leases | | | 126,928 87 |
| Prepaid royalties on ore and coal and prepaid insurance | | | 466,825 55 |
| Inventories of raw and finished materials | | | 4,407,651 67 |
| Accounts and bills receivable | | | 2,507,560 59 |
| Cash | | | 1,038,532 47 |
| | | | $56,317,034 88 |
| LIABILITIES: | | | |
| Capital Stock Issued: | | | |
| Preferred | $20,852,000 00 | | |
| Less in treasury | 435,100 00 | $20,416,900 00 | |
| Common | 27,352,000 00 | | |
| Less in treasury | 161,000 00 | $27,191,000 00 | |
| | | | $47,607,900 00 |
| Accounts and bills payable | | | 5,564,097 97 |
| Reserve for depreciation of ore and coal mines | | | 251,805 55 |
| Reserve for Taxes and Insurance | | | 187,608 05 |
| Reserve for possible loss in collection of outstanding accounts and bills receivable | | | 68,901 21 |
| PROFIT AND LOSS ACCOUNT: | | | |
| Net loss during year | $ 254,188 43 | | |
| Add quarterly dividend of 1¼% on preferred stock paid Oct. 1, 1903 | 357,295 75 | | |
| Amount to be deducted from surplus | 611,484 18 | | |
| Surplus June 30, 1903 | 3,248,206 28 | | |
| Surplus June 30, 1904 | | | 2,636,722 10 |
| | | | $56,317,034 88 |

The report of the committee appointed to determine the tonnage of coal and iron ore contained in the properties of the company in Alabama shows that there are 39,041,800 tons of red ore, 49,041,800 tons of brown ore, 173,542,000 tons of coal and a very large supply of limestone, of which tonnage was not estimated.

## THE STORY OF A STRIKE.*

BY W. P. EAGAN.

The length to which a strike by a trade union of highly skilled and presumably intelligent mechanics will be carried, is as well exemplified in the history of the machinists' strike at Quincy, Ill., as in any case that has come under the writer's notice. The facts will be here given without comment, it being felt that the conclusion which will inevitably be drawn, is that this organization has been engaged in the most wanton and unwarranted trade dispute of recent years.

In March of 1903, one of the employes of the Quincy Engine Works was arrested at the instance of his wife, and was fined for assaulting her. He was absent from his work for a week or more. On his return he was reinstated in the employ of the company, notwithstanding the fact that they would have been justified in discontinuing his services. Within a very short time he was again arrested, this time being taken to Chicago on a charge of being concerned in a murderous assault upon a non-union man who had been working during the machinists' strike at the Allis-Chalmers Co's plant. He was again absent for a considerable time, and the officers of the Quincy Engine Works had no means of knowing when he would return. Another man, a member of the union, was put to work in his place. On his return, the union demanded his immediate reinstatement. The officers of the Quincy Engine Works replied to this demand that the place was filled and that they had no position open. On the demand being insisted upon, the officials of the engine works offered to arbitrate the question of reinstatement. The shop committee replied that it was not a matter for arbitration, and that this man must be given his old job or the union would strike.

The men went out in April of 1903 and since that time the shops have been closely picketed, assaults and intimidation have been or frequent occurrence, ranging in gravity from the mere use of the word "scab" to cases of attempted murder.

Through the efforts of the National Metal Trades Association, men were supplied to take the places of the striking machinists, and for more than a year the shops have been completely manned and work has progressed satisfactorily to the employers. A greater production per operative has been gotten, owing to a complete removal of the limitations usually placed upon the output of a shop employing members of this union.

The conditions which exist today illustrate the extent to which a strike of this character, maintained in the way this one has been will affect the welfare of a city. Quincy is a city of about 50,000 inhabitants. It is distinctly a manufacturing city. Factories in various lines abound and a large percentage of the population is made up of men who work with their hands. The aggregate investment in manufacturing institutions and manufacturing property is very great. Owing to the non-enforcement of the law, these institutions are suffering untold damage. Many industries that it was hoped would locate in Quincy have located elsewhere, it being stated by prospective investors that investments in Quincy, under present conditions of union domination and control, are unsafe.

A few of the many instances of outrages committed in the name of and on behalf of the strikers and the outcome of such cases will serve to show a condition that the writer believes does not exist in any other manufacturing community in the country today. The history of the strike is replete with acts of lawlessness on the part of the striking machinists, and the apathy of the authorities and of the business community generally is astonishing. There appears to be an absolute indifference on the part of the majority of those who are vitally interested in Quincy's welfare. Repeated efforts to induce the authorities to act vigorously in the repressing of lawlessness have failed. This indifference has been so marked that many violations of the law have never been reported, no confidence being felt that effective measures would be taken toward the punishment of those guilty.

*Mr. Eagan is commissioner of the National Metal Trades Association.

When the trouble started, a year and a half ago, the machinists went to the mayor of the city and secured his permission to pitch their picket tent on public property adjacent to the Quincy Engine Works—this to enable them to be present, even though the weather be inclement, to assault and annoy men who might exercise their right to work.

In one of the many affrays one of the non-union employes was shot by one of the striking machinists, who was recognized and against whom the strongest kind of evidence was secured. The victim was in the hospital at the point of death for several weeks and when he came out was so badly crippled that he still has to use a cane to get about. The grand jury indicted his murderous assailant and he was brought to trial. The jury disagreed, eight of them having voted for conviction and four for acquittal. The case then went over to the next term, but has never been tried. Without notice to the prosecuting witness or to the attorneys for the employers, this case was dismissed and no reason has ever been alleged for the discontinuance of the prosecution.

On another occasion, one of the employes was assaulted by a striking machinist and injured so seriously that he was in the hospital for a long time. Again the employers had the strongest kind of a case against the assailant. He was arrested and indicted by the grand jury and charged with assault to kill. His testimony before the examining magistrate was of such nature as to justify his indictment on the charge of perjury and the grand jury returned such indictment. His case was continued from time to time and finally being called, he offered to plead to a common assault, which plea was accepted by the State's attorney and he was fined a trivial amount. At the same time a nolle was entered in the perjury case. These cases were also dismissed without notice to the prosecuting witness or to the attorney who had been active in collecting evidence against the man and assisting the prosecution.

The hostile disposition of the police is shown by the fact that in serving warrants for carrying concealed weapons, which warrants had been sworn out by a striking machinist, on some nine of the workmen, the officers chose to serve these warrants in the street car and in the presence of the strikers searched the men, with the result that no weapons were found upon any of them.

In a case of prosecution of one of the men for the use of insulting and indecent language, when the workmen were going home from the shop, and for which he was arrested on the charge of disturbing the peace, the court held that this man could not be guilty under the statute in question, (which provides for punishment for wilfully disturbing the peace and quiet of a neighborhood) because the alleged offense was committed in a manufacturing district and not where persons resided; that therefore there was no neighborhood and consequently no violation of the law under the statute in question.

Two attempts were made on the life of a foreman who had incurred the enmity of these strike pickets. One night while he was on his way home he was shot at from ambush, and later while at home, surrounded by his family, a shot was fired through the window of his house. No arrests were ever made. The houses of many of the workmen and of one of the attorneys for the employers have been repeatedly stoned in the dead hours of the night, windows broken and property destroyed.

About a month ago strikers congregated in the vicinity of the Engine Works and assaulted a number of the employees as they left the works for their home. The evidence against the assailants was again clear and conclusive. The president of the machinists' lodge was present and participated. Nine men were arrested. Their cases were continued several times and then dismissed without being brought to trial.

Within the last few days a valuable machine was wrecked by the placing of a file in its feed mechanism. The man who did this has confessed that he went to work in the shop the day before this occurrence at the request and under instructions from the machinists' union. The officials of this union gave him a letter of introduction which had been given to another man by the secretary of the St. Louis Metal Trades Association. He maintains that he does not know how these officials came into possession of this letter, and it

can only be surmised that they waylaid the man intended to be introduced and took it from him by force.

These are only a few of the many cases that could be cited. They illustrate, however, the extremes to which this union will permit its members to go.

The President of the I. A. of M. in his annual report dated July 1, 1904, states that the grand lodge has already paid $15,250 on account of this Quincy strike. How many thousands of dollars have been contributed by subordinate lodges throughout the country and by other trade unionists in Quincy will probably never be known.

It is to be especially noted and kept in mind that this strike is not for the maintenance of any principle of unionism and if successful, could not possibly result in furthering the interests of the association at large. It is purely a personal affair. If an employer ever had good reason to replace a man, the Quincy Engine Works had.

The authorities of the city of Quincy have permitted these outrages to multiply and continue, until a condition exists that would be tolerated in few communities. The material interests of that city have been disastrously affected. No remedy for this condition will be found until the conservative and law-abiding citizens of the city unite to bring to bear such influence upon the authorities as would cause them to perform their sworn duties.

Quincy has thrived on her manufacturing interests, and her citizens should realize that a continuance of conditions now existing will preclude the possibility of her increasing her manufacturing enterprises and must ultimately terminate in driving existing interests out of the city or out of business.

## Duluth's Copper Mine Operations.

As an indication of what some man's name will do, this is told from Duluth: An old and several times abandoned copper mine in Sonora, Magdalena, Mex., got into bad ways, partly at least through the incompetency of the Mexicans in charge. Americans took hold, saved the titles, revised the company's capitalization, and changed it from a copper to a gold mine, for which it was probably better fitted. A certain amount of stock was alloted for sale and in one day Duluth subscribed for and paid down $1 each on more than 100,000 shares, on which $5 each is to be paid. All this because T. F. Cole, president of the Oliver Iron Mining Co. and head of the Calumet & Arizona group of copper mines, had visited the property, thought well of it, and because it was rumored that he was to be associated in its control. Mr. Cole, though a considerable holder of stock in the new company, is not a director, and will have nothing to do with the management other than, possibly, in an advisory capacity. This is the Black Mountain Mining Co., of Chicago, which has taken over the properties of the Nogales Copper Co. Mr. Cole's success in the Calumet & Arizona and associated mines and prospects, in Southern Arizona, is said to have been nothing less than phenomenal, and the only mine of the group that has had time to develop into a dividend payer has been the most wonderful financial comet that has passed across the mining horizon for a generation. This is the Calumet & Arizona, which in the twenty-two months its smelters have been installed has earned, net, $3,400,000, of which $1,300,000 has been distributed in dividends.

The proposition recently made by J. J. Anderson, of the National Electric Co., Milwaukee, to the Chamber of Commerce of Tacoma, Wash., relates to an open-hearth steel plant. The Pacific coast market is now supplied from the Mississippi Valley. The promoters state that besides securing the raw material at a much lower rate, the local plant would save a high freight and have an advantage in the matter of time in delivery. While in Tacoma on a business trip for his firm, Mr. Anderson noticed that vast quantities of scrap steel could be purchased at $8 or $9 per ton, and figured that the Pacific coast market would take the output of a considerable plant. He proposed that if Tacoma would guarantee to raise one-third of the capital, he would undertake to raise two-thirds in and about Milwaukee. This is as far as the proposition has as yet gone.

## HIGH SPEED STEEL TESTS AT ST. LOUIS.

A test of high speed tool steel was announced to take place on Sept. 10 at St. Louis, and in view of the general interest in the latest developments in cutting tools, the undertaking was welcomed as a decidedly attractive addition to the special features of Machinery Day at the World's Fair. The preliminaries pertaining to the contest were amicably arranged at an initial meeting held on Aug. 12. Representatives of a number of prominent firms were then present and the following stipulations were proposed and accepted as the governing conditions of the contest:

The size of tools to be 1½ x 2¼ in. and 1 in. square when used in Armstrong toolholders. One of the Wm. Sellers Co.'s tools was approved as the standard shape; each tool to be ground on a Wm. Sellers Co.'s grinder to this form. Every contestant was required to bring his steel bars and have them forged on the grounds and each maker was required to furnish sufficient steel for two tools of the sizes designated. The number of tools was limited to two forged tools and two tools for Armstrong toolholders. The test cut was agreed upon as ¾ in., or a reduction of 1½ in., 3-16 in. feed, at a cutting speed of 100 lineal feet per minute, to be continued as long as the tool would stand up and retain the proper cutting edge, this to be determined by the judges. On the test of the second tool in each case the speed and feed to be determined by a majority of the judges. The falling down of the tool to be indicated at that stage when it loses size of cut. If a tool breaks between the cutting point and the toolpost, the fracture determines the life of that particular tool and if the second tool breaks between these points it terminates the test of that particular brand of steel. The various brands of steel offered for test to be the same as is regularly offered on the market for sale. The tools after being forged, tempered and ground to be turned over to the committee. No preliminary test to be permitted before the official test. But one brand of steel to be entered in the contest by any one representative.

A committee of five was also appointed to take charge of the tools, examine steel, and direct other preliminaries to the contest.

The test did not take place on Sept. 10 as was the original intention, but was postponed until Sept. 12. On the latter date only the representatives of Edgar Allen & Co., Ltd., the McInnes Steel Co. and Hugo Reisinger proceeded with the test. A number of other steels were tested, however, but under protest, the representatives having withdrawn.

The tests took place in Block 9, Machinery Hall, in the exhibit of Manning, Maxwell & Moore. A motor driven lathe made by the Putnam Machine Co. of Fitchburg, Mass., and forming part of the exhibit of Manning, Maxwell & Moore, was selected for testing purposes. The cutmeter made by the Warner Instrument Co. of Beloit, Wis., was used in determining speeds, etc. The judges were J. Leon Replogle, superintendent axle department Cambria Steel Co., Johnstown, Pa.; Mr. Young, mechanical engineer with the Pennsylvania Railroad, and the assistant master mechanic of the D. L. & W. R. R., from Scranton, Pa., who represented the superintendent of motive power of that road. The complete tabulated report has not yet been distributed but the foregoing statement of the test preliminaries and the outcome will give some information to those who may have been mystified by reports that the test of tool steel scheduled for St. Louis has taken place, and another statement made with equal positiveness that it has not taken place.

Surveys are already being made at Youngstown, O., for the location of the rail and sheet bar mills of the Republic Iron & Steel Co. The rail mill will be located on the site now occupied by some of the departments of the Brown Bonnell plant and will necessitate the removal of bar mill No. 3, No. 3 puddle mill and an old machine shop.

The Toledo Metal Furniture Co., Toledo, O., recently incorporated, was organized to absorb the Uhl Bros. Co., which had insufficient capital and a reorganization under a new name was thought preferable by those who are furnishing the cash capital. The business will be conducted at the plant now occupied by the Uhl Bros. Co.

## LAKE SUPERIOR IRON MINES.

The Helen mine of the Lake Superior Corporation, at Michipicoten, is now employing about 160 men and the output is averaging between 800 and 1,000 tons per day. A considerable part of the ore is being shipped to the United States on contracts, but some of it will be used at the blast furnaces of the Lake Superior Corporation at the Soo.

A second steam shovel has been added to the equipment of the Leonard mine on the Mesabi range. It is expected the daily shipment will be doubled. The output has averaged about 1,200 tons per day.

At the United States Steel Corporation's Chapin mine, at Iron Mountain, ore is being loaded with two shovels. Shipments of more than 25,000 per week are being made. Some ore that has been in stock several seasons is being forwarded.

The Buffalo & Susquehanna Co.'s Munro mine, near Norway, Mich., is shipping more than 500 tons per day. The property resumed recently and it is expected to continue active all winter. This company may take over the Perkins mine of Norway, which has recently been inspected in the interests of the Buffalo & Susquehanna people. The Perkins was a big and profitable producer in the first decade of Menominee Range mining. It was opened in 1879, closing in 1890 when the limestone in the foot and the jasper in the hanging wall came together and pinched out the ore body at a depth of 400 ft. Recent exploratory work has shown results that lead to a belief that there are other workable deposits

Plans are now being made for the unwatering of the Great Western mine on the Menominee range. An order was placed during the week for a blower, to be used hereafter in keeping the open pit free of water.

The new plant, so long talked of for the Tobin mine, has been ordered. It will be a first motion hoist with 10-ft. drums. The present battery of boilers will give place to a new one of the latest type of high pressure boilers.

The Schlesinger Co.'s Palms mine, Gogebic range, is in operation after an idleness of over a year. At present only one shaft is being worked.

Developments on the famous section 30 Vermillion range are very disappointing. Extensive explorations have been made during the past year. It is feared that the cessation of operations, if it comes, will have a depressing effect on operations throughout the entire Vermillion range.

The exploratory work of the International Iron Co. on Hunter's Island, a few miles north of the international boundary line on the easterly extension of the Vermillion, is not proving as satisfactory as it was hoped. In one of the holes driven by diamond drill, ore was cut a few weeks ago, but it was a narrow seam and was mixed ore and jasper.

The annual report for inspector of mines for Marquette county, Michigan, for the year ending Sept. 30, 1904, shows that there were a total of 4,024 men employed during the year and that only 15 fatal accidents occurred, an average of less than 4 to the 1,000. This is far less than the average in Iron county, whose mines are about Crystal Falls, where the average was 17 to the 1,000. It is an uncomplimentary fact that Iron county's annual average is far above that of any other iron mining region in the Lake Superior country, evidencing, possibly, a less careful supervision and less regard for the life and safety of employes than elsewhere. Iron county's mines should be no more unsafe than those of Negaunee, Lake Antoine, Iron Mountain or Iron River. In his report to the supervisors of the county, Inspector Tregonning, of Marquette, says that he is confident that a large share of the fatalities incurred in blasting operations are due to the fact that miners seem determined to work about powder with lighted candles in their hands or on their heads. Of the 15 accidents in Marquette county, only two were caused by fall of ground, a showing that gives remarkable testimony of the care exercised by mining companies in their underground operations. Falling down shafts was the cause of a third of the accidents. There are now 22 mines in operation in the Marquette district and 12 in that of Crystal Falls.

Fayal mine, Minnesota, is not likely to come anywhere near its record of the past few years, and will not produce in 1904 more than 1,200,000 gross tons. It is now up to about 900,000 tons for the season, and is shipping comparatively at a slow rate. The new pit running off southward toward the Troy mine is being tripped as fast as possible, but very little of this year's product is coming from steam shovel works, except as a shovel is employed in the bottom of No. 2 pit at the east side of the mine. This mine will be in shape another year for an immense output. Not only will its new great pit be ready for shovels in ore, but its No. 4 shaft, being sunk in rock, will be connected with the main drifts and will be in shape to produce largely. The big pit will not be completed for some years, as the contract given there a year ago to the Drake & Stratton Co. called for 2,000,000 yards, but much ore will be uncovered and ready for operations.

Mountain Iron mine, at the village of the same name, on the Mesabi iron range, will be developed largely the coming season. The entire westerly side of the pit will be rolled back and widened so that trains can move in the mine without switching and can come in on one side as emptied, pass the shovels continuously and go out the other side still made up as when they entered the pit. This will be of the utmost moment in cheapening costs of production and increasing possible output. The mine has been working with ease this summer and is making an output of about 1,000,000 tons. Four benches are opened for mining and four shovels are stationed about the mine. Very little stripping has been carried on during the season.

## Export Ore Shipments from Port Henry.

We have already referred to the shipments to Germany this year of 50,000 tons of Port Henry, N. Y., magnetic ores for use in the furnaces of the Westphalian district, where a basic steel is the product. The ore shipped is the crude product of the Witherbee, Sherman & Co.'s mines, running 60 percent iron and 1.50 percent phosphorus. Seigfried Pels, European agent of the company, is now in this country, and the expectation is that exports the coming year will be much larger than for 1904, especially if proper freight rates can be assured. This ore is carried on ocean liners as ballast and an especially low rate has been given for some time. Witherbee, Sherman & Co. are mining heavily at Port Henry now and are concentrating much of their product to a most remarkable purity, getting a regular result of 71.60 percent iron. As is well known, theoretical purity of magnetite is 72. W. P. Schilling, formerly in charge of the Biwabik mines, Minnesota, is in charge at Port Henry.

The Electric Controller & Supply Co., of Cleveland, posted a notice in its drafting room recently to the effect that it was the intention to send a man to St. Louis to relieve the representative in charge of the company's exhibit at the Louisiana Purchase Exposition. It was decided to choose the new man by a contest among the draftsmen. Each contestant was required to write two articles, one on the company's improved direct motor drive for planers and the other on its mill table controller. All work on these articles was done outside of office hours. The four judges were: A. C. Eastwood, engineer; R. I. Wright, assistant engineer; Harold McGeorge, general manager, and J. H. Hall, chief draftsman. The competition was keen and a number of interesting papers were presented. A decision was rendered in favor of Geo. W. Magalhaes, formerly a student at Case School of Applied Science and later a graduate of Columbia University. Mr. Magalhaes will start for St. Louis within a few days and remain in charge of the company's exhibit until the close of the fair.

The Wellman-Seaver-Morgan Co., Cleveland, announces that on Oct. 1, it opened a New York office, having taken a suite of offices at 42 Broadwav. Geo. B. Damon, a well known engineer, has been appointed manager.

The Virginia Iron, Coal & Coke Co. advises us that there is no truth in the report that it is removing its steel plant from Middlesboro, Ky., to Max Meadows, Va. The company is neither increasing its present plant at Max Meadows nor building a new one there and it does not contemplate so doing.

## NEW ENGLAND FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the New England Foundrymen's Association was held at the Exchange Club, Boston, on Wednesday, Oct. 12. B. M. Shaw, the president, occupied the chair.

Announcement was made of the death of Archer Brown, of Rogers, Brown & Co., who had addressed the association and was on its program for the coming winter. On motion the president appointed Messrs. Magee, Lovejoy and Snow as a committee to prepare resolutions.

### The Casting of Iron.

The president introduced C. H. Thomas, Newark, N. J., president of Associated Foundry Foremen, who addressed the meeting on "The Casting of Iron." The speaker exhibited a few samples of cast iron made from the same mixture but made several days apart, showing how uniform the mixture had run. These proved very interesting to those present. Mr. Thomas's address was in substance as follows:

We all know that for the production of good castings we must have at the start a good cupola, a good blower, good fuel, good iron, a good melter, a good pattern, a good flask, good sand, a good molder and a good foreman. We might add, "a good firm," but this goes without saying. There are so many cupolas considered first class machines that it is not within my proper province to recommend any particular make or type, as being the best. If I were asked what I would do in regard to procuring a cupola I would reply that if it was for running off large heats, say 35 tons or over, I would have it built by a reliable boiler maker. The seams and joints should be calked and the sheets should butt each other and be fastened together by a band around the outside. The cupola should be built of good material and not thrown together, as is the case with the manufactured-while-you-wait article. All the rivet and bolt holes should be countersunk in the inside of the shell and the tuyeres so made as to avoid cutting the firebrick or blocks. The cupola should be designed so that the lining when new will conform to the shape in which it will burn out after continued use.

My experience has been that the blast striking directly against the fuel is to a certain extent deflected from the center of the cupola and finds an easier exit between the firebrick lining and the fuel and stock. This causes the former to wear out quite rapidly, particularly if there is very much slag. Slag formed in the cupola seems to have a great affinity for the firebrick lining. It simply devours it when a very strong blast is used.

The idea of carrying the tuyeres toward the center of the cupola is not new. It was employed in the construction of the McKenzie cupolas and gave very good results with lump coal. These cupolas were not very rapid melters but the iron came very hot. I have used coke and Lehigh coal mixed in charging these cupolas but never tried to run entirely with coke so cannot say what the result might have been in that case.

The bricks can be kept closely together where there are no bolt or rivet heads to interfere and thus a longer life is assured to the lining. The further apart the bricks are the more readily the blast attacks them. I use a mixture of one part fireclay or kaolin and three parts of No. 3 Jersey molding sand as a thin mortar. It stands the extreme heat better than the fire sand. I also use this No. 3 sand to make up the breast.

I try to melt as hot and as rapidly as possible, the saving of time in molding being quite an item and the addition to the daily output one of the vital points in reducing the cost of production. This can be readily accomplished by the foreman if he goes at the matter systematically. He must use diplomacy and tact in approaching the men with whom he has to deal. The success of the transaction depends on how well posted each party may be. In the larger shops where most of the casting is done after the molder leaves the shop, the overtime of the helpers assisting in the casting can by rapid melting be reduced to a minimum. We have just installed a new positive blower, cutting off one-third of the time previously taken in casting. We have discarded overtime for all but four helpers and two crane operators who remain to take off the weights and break the bad castings that accumulate from time to time.

I have here a few samples of cast iron from the same mixture but made a few days apart and these show how uniform our mixture runs. We believe that when we get a good mixture it is best to stick to it as long as we secure excellent results. Our castings vary from ⅛ in. to 2 in. or more in thickness, and are principally ornamental, stair, jobbing and column castings.

Our test bars are 1 in. square and 14 in. long, 12 in. between bearings and break at from 2,800 to 3,300 lb. We use a certain kind of scrap and two brands of pig purchased from two makers. It has been our experience that it is better to use all agricultural or railroad scrap in forming a good mixture. We then keep the silicon and other components more uniform than by buying any or all scrap iron that comes along. By keeping to one kind of scrap we soon find out what pig iron is best adapted to our work; and when this has been accomplished we are ready to make castings varying in thickness from very thin to very heavy work from the same mixture and get good results.

We do not have enough light work to always run separate charges. Even if we had, the molders are not always ready for the metal when it is melted and therefore we have to cast our light work at any time during the heat when the molder gets ready. The only time we have trouble with hard castings is when there is a change from one scrap iron to another or a change in pig. Our mixture stands acid and heat tests that are very severe. Sometimes the casting is of a peculiar shape and we either add more pig or leave it out entirely. Some of our castings require a very soft iron and then we use 50 percent each of pig and scrap. This mixture is too rich for the general run of castings, particularly if there are light as well as heavy sections, as is the case with gear blanks. When the gear arms are light and the rim heavy we may find large shrink holes on cutting into the rim. These holes are due chiefly to too much silicon and graphitic carbon, the graphite being quite apparent.

We have here a section of a flange broken from a steam separator body. This casting was made in a radiator and heater shop where the castings run about 3 percent silicon. The fragment is from the drag or nowel side, at the lowest point in the mold—the last place where a defect should appear. Had the mixture been from 2.2 to 2.25 percent in silicon this unsightly hole would not have occurred, the casting would have been sound, the core saved, the machine work carried out and a finished casting made, representing so many dollars and cents. The iron mixtures in this particular shop were in charge of a man who is an expert in steam fitting and plumbing.

Compare this piece of flange with a high silicon one. The latter was cast from a mixture of 20 percent pig and 80 percent scrap. The grain is very open. There was a slight defect and we made the burn with the same mixture but found it so hard that we could not machine it. We learned that to make a burn properly we must use a much softer mixture than was used in the casting. Although we had previously heated the casting it acted as a chill and the metal did not unite as when the soft iron was used. It is also necessary when making a burn to use an iron that will shrink but very little. The mixtures I have mentioned will not do for all classes of work. I do not recommend the use of as much scrap as is given here. There are but few pig irons that are good scrap carriers and there are many pig irons that need doctoring. The only way to arrive at an ideal mixture for your work is to experiment with one grade or class of scrap iron and three or four brands of pig to select from until you reach the desired result. So much trouble has been caused in our foundries by the indiscriminate use of pig iron that it is time the foundrymen awoke to the fact that if they use considerable good scrap as a physic a whole lot of their trouble will disappear.

With your troubles disappearing in regard to iron, there is yet another essential in the production of good castings—the good metal must be poured into good molds. You may have to make changes in molders. There is, however, one advantage on your side. You can instruct the apprentice just how you want the mold made and he will invariably do as

he is told. Keep your apprentices interested in their work. Be liberal with them and keep them advancing. You undertake to teach them the trade of molding and casting iron. It stands you in hand to see that they have frequent changes and are given the best work in the shop. As fast as they master one part, push them along to another, for they will be the future casters of iron.

Those who generally keep a boy on one piece or class of work from one year's end to another, deplore the scarcity of good molders. Your foreman may be to blame. He is struggling to increase the output in pounds and is liable to fall into the error of keeping the boy on some job where he gets a large product. He forgets that the boy came to learn a trade and on this last depends the future of the foundry business.

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After a short intermission dinner was announced, after which President Shaw introduced Thos. D. West, Sharpsville, Pa., who gave a very interesting address on: "Shrinkage Troubles and Methods of Feeding." At the conclusion of the address, a rising vote of thanks was extended to Messrs. Thomas and West. The meeting adjourned at 9 o'clock. The following were in attendance:

Thomas D. West, Sharpsville, Pa.
B. M. Shaw, Walker-Pratt Mfg. Co.
Chas. H. Thomas, Newark, N. J.
Geo. H. Lincoln, G. H. Lincoln & Co.
Geo. H. Gibby, Gibby Foundry Co.
W. B. Snow, B. F. Sturtevant Co.
L. N. Perrault, B. F. Sturtevant Co.
John Magee, Magee Furnace Co.
Fred F. Stockwell, Barbour-Stockwell Co.
Wm. H. Bense, Kingsley Iron & Machine Co.
D. L. Moody, Rogers, Brown & Co.
W. G. Moody, Rogers, Brown & Co.
M. L. Gay, Rogers, Brown & Co.
W. M. Saunders, Saunders & Franklin.
C. Hitch, Jr., American Tool & Machine Co.
C. A. Reed, N. S. Bartlett & Co.
G. O. Sawyer, Hartford Laboratory Co.
Wm. C. Doherty, Doherty Bros.
C. C. Boyden, Matthew Addy & Co.
S. M. Thompson, Barbour-Stockwell Co.
F. H. Ellis, Barbour-Stockwell Co.
E. J. Lyon, Brown & Sharpe Mfg. Co.
Z. R. Tucker, Brown & Sharpe Mfg. Co.
G. H. Carson, Mechanics Iron Foundry.
R. H. Penney, Barbour-Stockwell Co.
T. C. Wilson, Barbour-Stockwell Co.
E. A. Tutein, Crocker Bros.
O. E. Nutter, Saco & Pettee Machine Shops.
Wm. J. Breen, Agt., Hugh W. Adams.
E. V. Hazard, Old Colony Foundry Co.
W. S. Wood, Cutter, Wood & Stevens Co.
W. T. Nicholson, Cutter, Wood & Stevens Co.
H. E. Gibby, Mechanics Iron Foundry.
Jas. F. Lanigan, Davis Foundry Co.
A. L. Lovejoy, Becker-Brainard Milling Machine Co.

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## Limestone Production in 1903.

The recently issued report of the stone industry in 1903 shows the quantity and value of the blast furnace flux produced in 1902 and 1903 by States. According to this tabulation—prepared under the supervision of David T. Day, chief of the division of mining and mineral resources, the United States geological survey,—the production of limestone quarried for blast furnace flux decreased from 12,139,248 long tons in 1902 to 12,029,719 long tons in 1903. During the same period the value increased from $5,271,252 in 1902 to $5,423,732 in 1903. It will therefore be seen that for the same period of time the value of the blast furnace flux quarried in this country increased $152,480 and in quantity decreased to the extent of 109,529 long tons.

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The Atlantic furnace of the Republic Iron & Steel Co., New Castle, Pa., which has been idle for several months, will be blown in shortly. The stack is now being prepared for an early resumption. Two of the four stacks of this company in the Mahoning and Shenango Valleys are now operating, and owing to the increased demand for steel it was found necessary to increase the pig iron output.

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A meeting of the presidents of the subsidiary companies of the United States Steel Corporation was held at Pittsburg last week. President Corey was also in attendance.

## FEATURES OF THE ST. LOUIS EXPOSITION.

### The Birmingham, Ala., Statue of Vulcan.

A little to one side of the center of the Mines and Metallurgy building at St. Louis, stands the great statue of Vulcan and the cast iron figure is sufficiently imposing to attract much attention. The statue is located in the Alabama exhibit. It is said that the legislature and governor of the State were opposed to making any exhibit at the World's Fair and the legislature adjourned without making an appropriation for the purpose. Some of the public-spirited citizens of Birmingham were not content that the opportunity should pass without due recognition and they succeeded in raising the funds for the admirable showing which is in place. The exhibit has been arranged around the colossal figure which is the largest cast iron statue ever made. It stands 55 ft. high and will ultimately be mounted on a 10-ft. pedestal at Birmingham. The head and shoulders of the figure have been made somewhat larger than true proportion would demand. This enlargement of the upper portion of the statue was designed to the end that everything would appear about right when viewed from the foot of the elevated position it will later occupy. This explanation will account for the disproportionate appearance of the work as a whole and which is clearly brought out in the halftone. The

STATUE OF VULCAN IN THE MINES AND METALLURGY BUILDING.

statue was modeled by Sculptor Meretti, of New York, and the plaster sections of the model were shipped to Birmingham and there the enormous castings were made.

### The Largest Timepiece.

The floral clock is immediately north of the Agricultural building. The mechanism of the clock is buried and the dial, 100 ft. in diameter, is but 6 in. above the ground. The dial, the hands, the minute hand (50 ft. long) and all of the frame are so covered with flowers as to quite conceal any mechanical contrivances.

The numerals marking the hour are 15 ft. in length and are made of bright colored coleus. In a circle surrounding the numerals are collections of twelve distinct plants, each collection being 25 ft. long and 12 ft. wide. Nature has ordained that each of these plants should open its blossom at a certain hour of the day. As the hands of the clock reach the numeral naming a certain hour the flowers in the great bed at the back of the hour so designated begin to open their buds.

Still another mode of computing time is shown, and this is by the primitive hour glass. On the south side of the dial

behind the numeral that denotes midday or midnight, is built a tower, 12 ft. square and 18 ft. high. The tower is of wood, and like most of the adjoining structures is covered with staff. The top of this tower is surmounted with a mammoth hourglass, made of heavy and clear crystal with the receptacles for holding the sand each 6 ft. in length and 4 ft. in diameter at the base. The hourglass is so suspended that when the sand is spent the glass automatically reverses itself and another hour is told off.

Concealed in the tower is the machinery, controling the steel shaft extending to the center of the floral dial more than 50 ft. away. Above the hourglass is suspended a sweet-toned bell, weighing 5,000 lb., on which the hour is announced. The sound is heard to the ends of the exposition grounds. With the first sound of the bell, the beautifully decorated doors to the tower swing open and the machinery that propels the great timepiece is exposed to view.

The entire center of the face of the mammoth floral clock, a space inside the numbered circle and 70 ft. in diameter, is composed of many colored atternanthere. This foliage completely covers the ground, but will never grow tall enough

THE FLORAL CLOCK AT THE WORLD'S FAIR.

to be touched by the hands as they pursue their course. This plant grows low and exceedingly dense.

The hands of the clock are made of a framework of steel, but wooden troughs filled with soil are provided, and in these troughs grow myrtle, ivy, and other green plants. The longest hand moves 5 ft. each minute.

The circle surrounding the numerals is 300 ft. in circumference and the sections of hour flowers each occupy a space 25 ft. long and 18 ft. deep. The sections thus retain their individuality. Surrounding the twelve groups of flowers is a circle of grass 6 ft. wide. The floral clock is the exhibit of the Johnson Service Co., of Milwaukee.

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At the meeting of the Colorado Fuel & Iron Co. held in Denver, Oct. 17, the refunding plan was adopted as outlined in the agreement between the debenture bondholders and the refunding committee. The capital stock of the company was increased to $47,200,000, and $45,000,000 of the industrial company's bonds were guaranteed by the Colorado Fuel & Iron Co.

## TRADE PUBLICATIONS.

A circular from the Crane Co. of Chicago, treats of its exhibits at the World's Fair and of the St. Louis headquarters. The company has an exhibit in Machinery Hall which includes practically everything in valves and other fittings required in steam, gas and water lines. These include improved pop safety valves, both encased and plain spring, for use on all kinds of stationary boilers, water and cylinder relief valves for all purposes. The display has a number of high pressure goods, pipe bends, flanged joints, valves and fittings. In the Transportation building is an exhibit of pop valves and boiler trimmings for locomotive and marine work. The company has established a bureau of information for convenience of its customers and friends, in the Frisco building, Ninth street, St. Louis, and a representative of the firm and a stenographer are in constant attendance. Special catalogue No. 100 has also been sent out and the 94 pages describe in considerable detail the line of valves, fittings, etc.

A booklet from Arthur Koppel of New York, illustrates the use of narrow gauge railway material. It contains an article entitled "On the Track" which has been prepared by Ernest Wiener, manager of the firm of Arthur Koppel. The article discusses transportation facilities with special reference to shop purposes, industrial railroads, etc.

The Fort Wayne Electric Works of Fort Wayne, Ind., has some new circulars descriptive of the multiphase revolving field generators, fuse boxes, etc. Several leaflets contain errata lists correcting circulars already issued.

A bulletin and handbook list describe the switchboards and panels made by the Bissell Co. of Toledo, O. The present information supersedes the data given in earlier publications and the numerous types of switchboard equipment are accompanied with many illustrations.

Steam Bulletin No. 11 of the National Equipment Co. of St. Louis, illustrates the branch steam trap. The working parts of this device consist of a multiplying system of double levers operated by a copper float which is free to slide vertically on a brass valve rod. The water collects in the body of the trap until the float exerts a pressure on the under side of the

lower lever. This pressure is multiplied six times and transmitted through the levers which then raise the valve off its phosphor bronze seat and allow the contents to be discharged. These traps are return type and will deliver water against any pressure less than the pressure in the trap. The same circular has mention of the National boiler compound. A number of references to installations using this preparation are submitted.

The Jones & Laughlin Steel Co. of Pittsburg, has a new price list of cold rolled shafting, couplings, pulleys, rope sheaves, belt tighteners, friction clutch couplings, etc. The book extends to some 200 pages and is well and freely illustrated.

The St. Louis Expanded Metal Fireproofing Co. of St. Louis, sends a record of some tests of reinforced concrete beams. These tests were made at the University of Illinois and are reprinted from a paper read by Professor A. N. Talbot at a meeting of the American Society for Testing Materials. A diagram shows graphically the relative efficiency of reinforced bars of different designs.

The Lidgerwood Mfg. Co. of New York, has a descriptive catalogue of cableways. The publication is 9 x 12 in. and has 160 pages. The treatment is comprehensive and the apparatus is shown at work in various parts of the world and upon all sorts of tasks. The excellent illustrations add greatly to the other good qualities of the book and are very clear and informing. Altogether the publication is an admirable specimen of two color typography.

A circular shows the gap lathe of the Gisholt Machine Co. of Madison, Wis. This lathe has the turret on carriage and is especially advantageous where pieces of large diameter have much boring and wide shaving work to be done at or near the center. There are several sizes of this lathe built, the largest swinging 60 in.

The Akron Chilian mill made by the Wellman-Seaver-Morgan Co., of Cleveland, is used for the wet grinding of metalliferous rocks. The pamphlet is an excellent piece of work. Printing and pictorial features are handled with much skill and the machine and its parts are clearly described.

The Rand Drill Co.'s latest circular, No. 19, illustrates the line of pneumatic hammers, drills and hoists made by this New York company. The hammers are seen at work chipping castings, on structural work and driving ⅞ in. rivets in the interior of the shield for the new East River tunnel. A number of drills are illustrated and a halftone of a piston air motor hoist shows a machine which is built in all capacities up to 10,000 lbs. for any desired lift.

The Canton Foundry & Machine Co., of Canton, O., is also proprietor of the Universal Machine Works and makes sheet metal working machinery, drop presses and dies for metal ceilings, air blast furnaces, pulleys, hangers, shafting, patterns, etc., as well as heavy and light castings. The industrial railroad equipment of the company's design has among other novel features a turntable with a serpentine or winding track. This track is circular and filled with balls. The depth of the ball track is varied to form shallow pockets with easy entering and descending grades. The table does not therefore bear upon the top of each ball equally—only rests on such balls as are at the upper portions of the track. It is claimed that this construction greatly lessens the friction found with the ordinary type of turntable.

George K. Hooper of 11 Broadway, New York, has in a recent pamphlet given a record of his past few years work in cost reduction. Mr. Hooper comments briefly on a number of plants for which he has done work as an expert in modern production methods.

Some important facts relative to the use and cost of lubricating graphites come in neat pamphlet form from the Joseph Dixon Crucible Co. of Jersey City, N. J. The varied forms in which this lubricant is made up for industrial purposes and the best way of handling it in order to obtain the maximum measure of possible success are discussed in straightforward fashion.

Sundry price lists of nuts, chains, washers, rivets, burrs, etc., are from the Allegheny Forging Co. of Pittsburg. A description is also sent out of the drop forged follower plate for railroad service. This saves the expense of drilling the hole, countersinking and riveting the thimbles to the plate.

# INDUSTRIAL SUMMARY.

**[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]**

**New Buyers in the Market and Some of Their Wants:—**

The Brantley Mfg. Co., Birmingham, Ala., has been incorporated with a capital of $100,000, of which $50,000 is to be paid in. The company will do a general foundry and machine business and engage in the manufacture of cotton gins, cotton mill machinery and cottonseed oil mill machinery. Incorporators are: J. S. Boggs, of Albany, Ga.; Ben T. Wade, of Troy, N. C., and H. Linden Zell, of Birmingham.

The Reliance Turbine Co., New York City, has been incorporated with a capital of $10,000, to manufacture boilers, etc. Incorporators and directors for the first year are: E. H. Ludeman, O. H. Ludeman, New York, and H. G. Cooke, Paterson, N. J.

Andrew J. Matrszek, manager of the Orscha Wire Works, Russia, is in the market for machinery for making wire, wire nails, welded and weldless chains, shovels, forks and horseshoe nails. He is expected to place some very large contracts. He is at the Inside Inn, World's Fair grounds, at present and will soon come East.

Application for a charter has been filed by the Cumberland Plateau Corporation, of Chattanooga, Tenn., which is to be capitalized at $500,000, with the following incorporators: Mark Packard, of Buffalo; T. R. Preston, W. D. Carswell, Samuel Bosworth Smith and Ross S. Faxon. The purposes of the company, as stated in the application, are to engage in the mining of coal and iron, operating furnaces and to deal in mineral lands in Cumberland county, Tenn. The corporation is said to have in its control about 20,000 acres of coal and iron lands in Cumberland and Morgan counties. A number of new mines will be opened and it is understood that blast furnaces will be built.

The John T. Abbott Machinery Co., Fort Worth, Tex., has been incorporated with a capital of $20,000, to deal in new and second-hand machinery. Incorporators are: John T. Abbott, Adrian Bronquist and Adam H. Herdman.

Proposals will be received at the Bureau of Supplies and Accounts, Navy Department, Washington, until Nov. 8, for a quantity of machine tools for the Portsmouth, Boston, League Island, Norfolk and New Orleans navy yards, comprising lathes, planers, bending and straightening rolls, expanding machines, cutting off machines, engraving machines, band-sewing machine, punching machine, milling machines, shears, helve hammer, steam hammer, air compressor, deck winch, drill presses, car wheel press, motor drives for various machines, traveling cranes, locomotive crane, centrifugal pump, steam pump, valve pump, engine and coal cars.

The Quebec Electric Co., Quebec, will soon be in the market for about 6,000 h.-p. of hydraulic-electric generating machinery and the necessary appurtenances. The plant is to be located at Ste. Anne and Seven Falls.

The Bureau of Supplies and Accounts, Navy Department, Washington, will receive bids until Nov. 1 for a quantity of supplies for the Mare Island and Puget Sound navy yards, including band resaws, cross-cut saw, engine lathe, molder, mortiser, etc.

The Lehighton Foundry & Machine Co., Lehighton, Pa., will soon be ready to purchase a quantity of new machinery for equipping its proposed new shops, but at present the company is in the market only for a four-spindle horizontal drill.

The Hewitt Supply Co., Chicago, has been incorporated with a capital of $100,000, to manufacture railway supplies. Incorporators are: Arthur Dyrenforth, H. M. Carter and F. L. Hunn.

The Haynes-Bates Mfg. Co., Chicago, Ill., has been incorporated with a capital of $30,000, to manufacture hardware specialties. Incorporators are: E. L. Haynes, George C. Bates and George E. Caughey.

The Harry Kiefer Co., Brooklyn, has been incorporated with a capital of $12,000. Incorporators are: Harry Kiefer, C. E. Scriven, and C. W. Coughden, Brooklyn.

A new industry about to be established in New Haven, Conn., is the American Ferrofix Graving Co. with a capital

of $500,000, of which $1,000 has been paid in. The company, which is promoted by New Yorkers, has filed articles of incorporation. The stockholders are: Charles A. Collins, Louis B. Grant and Charles H. Werner, all of New York. The concern will manufacture, grave or otherwise repair machinery and also design and construct machinery and plants.

The Bell File & Rasp Co., Kansas City, Mo., has been incorporated with a capital of $5,000. Incorporators are: W. F. Graham, Walter Rider, M. L. Bell and others.

The Kansas City Car Co., Kansas City, Mo., has been incorporated with a capital of $100,000. Incorporators are: C. B. Eaton, A. C. Hunt and L. Harwood.

The House Cold Tire Setter Co., St. Louis, Mo., has been incorporated with a capital of $200,000, to manufacture cold tire shrinking machines for vehicle wheels, etc. Incorporators are: S. N. House, Walter W. Scott, Martin Mittler, Talmage Wardlaw, Henry Moyers and J. L. Scott.

The Baldwin Equipment & Supply Co., Chicago, has been incorporated with a capital of $2,500 to manufacture railway equipment, machinery and supplies. Incorporators are: Luther H. Baldwin, E. A. Gaidzik and W. C. Hunt.

The Lawrence Pump & Engine Co., of Lawrence, Mass., has been incorporated with a capital of $24,000. The officers and directors are: President, Hiram L. Mellor; treasurer, Francis A. Hall; clerk, Percy Hall, all of Lawrence, Mass.

Starks Heater Car Co., Chicago, has been incorporated with a capital of $50,000. The incorporators are: Justus Chancellor, Nellie McDonald and T. S. Harper.

S. B. Robertson, Mount Holly, N. C., is in the market for complete equipment of machinery for a new foundry.

The Budke Stamping Co., of Pittsburg, has been granted a charter with $50,000 capital, to operate a metal stamping plant at Canonsburg, Pa. The incorporators are: William H. Paxton, John F. Budke, George D. McNutt, George W. Retting and John M. Watson.

The Eagan Steel Foundry Co., Pittsburg, has been organized by Daniel Eagan, formerly vice president of the American Steel Foundries, and formerly president of the American Steel Castings Co., and his son, J. H. D. Eagan. A site has been secured at Verona, Pa., a short distance from Pittsburg, and contracts will be awarded shortly for the erection of the plant. The company has opened an office at 706 Home Trust building, Pittsburg.

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**Fires and Accidents:—**

Fire destroyed the building occupied by the erecting department of the Chicago Locomotive Works. The machinery was badly wrecked and the loss is about $8,000.

The foundry and machine shop of Ben S. White, Shreveport, Ia., was destroyed by fire Oct. 9. The plant was valued at $35,000.

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**New Construction:—**

H. S. Kerbaugh & Co. have bought a site of 27 acres at Marysville, Pa., on which shops will be erected for building and repairing machinery. A machine shop 340 ft. long with two annexes, a forge shop, foundry and other buildings will constitute the plant. It is expected that work on the plant will be started at an early date.

The work of repairing one of the Birmingham furnaces of the Sloss-Sheffield Steel & Iron Co. and the Vanderbilt furnace of the Tutweiler Coal, Iron & Railroad Co. is being pushed. Both companies expect to be able to resume operations at their respective plants by the first of November. Both stacks are being relined and otherwise improved.

The Portland Wire & Iron Works, Portland, Ore., whose plant was destroyed by fire some time ago, has built a new plant equipped with modern machinery. The company makes a specialty of ornamental iron work and has been very successful.

The shops and yards of the Atlantic & Birmingham railroad, at Waycross, Ga., are being enlarged preparatory to the large increase of business expected during the winter. The work of enlarging the buildings began last week. The company has purchased new machinery which will be installed as soon as the buildings are completed.

The Twin City Foundry Co., Sterling, Ill., will build an addition to its plant.

The Jacksonville Bridge & Iron Co., Jacksonville, Ill., is building an erecting shop 100 x 140 ft., of brick and steel construction. A 15-ton crane will be installed.

The Standard Stove Lining Co., Taunton, Mass., succeeds to the business of the French & Winslow Stove Lining Co., of that city. The plant will be improved both in buildings and machinery.

The rolling mill plant of the Portland Iron & Steel Co., of Ligonia, near Portland, Me., which was destroyed by fire some time ago, has been rebuilt and equipped with new machinery and is now in operation.

No. 1 Ashland furnace, Ashland, Ky., has been rebuilt and will be blown in in a few weeks.

Bellefonte Furnace, Bellefonte, Pa., has been put in blast after being relined and repaired.

Adrian Furnace, Punxsutawney, Pa., was blown out Sept. 26 for relining.

The Buckwalter Stove Co., of Royersford, Pa., has just completed a large addition to the foundry department of its extensive plant, making floor space for 90 molders. A new cupola has been installed, additional machinery has been purchased, an interior telephone system has been placed in operation and other improvements have been made. The concern was established in 1865 and has been making steady progress. Recently ground adjoining the present plant has been purchased to enable the company to build further additions when necessary. The company is now employing about 200 men. An architect has been engaged to prepare plans and specifications for a six-story warehouse, 60 x 100 ft.

A two-ton Tropenas converter is being installed by the Massachusetts Steel Casting Co., Everett, Mass., successor of the United States Steel Co. The plant will be ready to make castings in about three weeks. The open hearth plant, consisting of two 15-ton furnaces, will be improved and will be ready for operation about Jan. 1.

The Walker & Ehrman Mfg. Co., Chicago, will erect a plant for the manufacture of milled machine screws and bolts and set and cap screws. When this plant is complete, the company will have double its present capacity.

The plant of the Stockton Iron Works, Stockton, Cal., recently destroyed by fire, is being rebuilt. The company will soon be in the market for saw bench, band saw, buzz planer and speed lathe. The company makes a specialty of clam shell dredges for building levees for reclaiming swamp lands.

The plant of the Franklin Iron Works, Port Carbon, Pa., recently wrecked by an explosion, will be rebuilt. The machinery was not damaged.

The U. S. Navy Department expects to construct a new foundry in connection with their Navy Yards at Charleston, S. C.

The Hennessy Foundry Co., of Springfield, O., will erect an addition to its pattern room.

Harkins & Mahern, proprietors of the Berlin Iron & Brass Foundry, Berlin, N. H., are building an addition to their plant 40 x 50 ft. The first floor will be fitted up as a machine shop and the second floor as a pattern shop and woodworking department.

The Cutler-Hammer Mfg. Co., of Milwaukee, Wis., has taken out a permit for the construction of a brick veneered foundry, to cost $950.

The Eaton, Cole & Burnham Co., Bridgeport, Conn., is adding a building 50 x 91 ft. and two stories to its old iron foundry. The old iron foundry, together with its addition, will be used as a brass foundry.

The Tennessee Stove Works, Chattanooga, Tenn., recently organized with a capital of $50,000 which will be increased to $100,000, have purchased a tract of 4½ acres just outside the city limits of Chattanooga and ground has been broken for two large brick buildings, which will be over 200 ft. in length. The plant will be in operation by Jan. 1.

The new plant of the Topeka Foundry, Topeka, Kan., is nearly completed and will be in full operation in a few days. The structure is 75 x 112 ft. The Topeka Foundry was established 18 years ago and has been very successful. It does a general machine and foundry business.

The Simplex Railway Appliance Co., Montreal, Ont., has purchased 43 acres at Lachine and will build large car works, employing 1,500 men and containing 15 buildings.

The Bacon & Collins Supply Co., Albany, Ga., will build a

foundry and machine shop at a cost of $25,000. Of this amount about $10,000 will be expended on site and buildings and the remainder on machinery.

To keep pace with the growth of its business the Peerless Motor Car Co., Cleveland, has purchased five and a half acres on Oakdale street and has begun the construction of a two-story machine shop which will be 258 ft. long and 50 ft. wide. This building will be the forerunner of several others which will cover the new site. The company expects to double its output.

The Stephens-Adamson Mfg. Co., Aurora, Ill., will build an extension to its machine shops which will be 120 x 80 ft.

The Pennsylvania Railroad Co.'s foundry at South Altoona, Pa., when completed, will rank with the largest in the world and none will surpass it in modern equipment. A force of 200 men is hurrying the several buildings toward completion. They will all be nearly finished by the first of the year and it is expected that the machinery will be installed by spring. The wheel foundry is almost complete and good progress is being made on the other structures. The wheel foundry will have a capacity of about 800 wheels per day. Two cupolas have already been erected and the power plant is nearly finished. Electricity will be the power.

The Reliable Gas Machine & Mfg. Co., of Bettendorf, Ia., is now occupying its new offices and the entire plant is nearly completed. The plant will have a capacity of ten complete machines per day, but a full force of men will not be employed until the first of the year.

The Sherwood Mfg. Co., Buffalo, N. Y., manufacturer of boiler and engine supplies, is now occupying its new plant. The main building is 50 x 120 ft., the converter building, 10 x 35 ft. and the foundry, 50 x 100 ft.

The Steubner Iron Works, Brooklyn, will build a two-story brick shop, 180 x 100 ft. with an open court in the center, and an extension 180 x 50 ft.

The Newton & Northwestern railroad will build shops at Boone, Ia. Construction will be begun at once.

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**General Industrial Notes:—**

The Standard Stove Works, which recently erected a plant at Columbus, Miss., are now operating with a working force of 60 molders. The plant has a capacity of 150 cook stoves a day, which the company states are sold ahead for 30 days.

The Kinnear-Hood Steel Co., incorporated eighteen months ago under the laws of New Jersey, will move from Irvington, N. J., to New Britain, Conn. It will occupy a plant now vacant and will manufacture a newly patented sheet metal radiator. The company has a capital of $300,000, of which $150,000 is paid in. The principal officers are: W. R. Kinnear, president; W. H. Hood, treasurer; Raymond Kinnear, vice president. The directors are: Howard S. Hart, president of the Russell & Erwin Mfg. Co., and Charles Glover, president of the Corbin Screw Corporation. The company agrees to employ not less than 200 men for a period of five years.

The Warner Motor Co., Northampton, Mass., recently incorporated with a capital of $30,000, will manufacture the Little Wonder water motor for grinding, sharpening, polishing, buffing and other light purposes; the Hydrogiant, a ball bearing motor, and a geared motor for furnishing light power to run machinery of various kinds.

The Gravity Iron Works, Carbondale, Pa., recently incorporated, do a general foundry business. They will occupy a plant operated, until about a year ago, by the Carbondale Metal Working Co. The incorporators are: John M. Kemmerer, Benton T. Jayne, Charles S. Jacobs, T. R. Hughes, Charles Raine and Daniel Slowe.

The promoters of the new Automatic Machine & Tool Co., of Toledo, O., have purchased the machinery of the Portage Motor Co., of Portage, O. They are now having the plant dismantled preparatory to the removal to Toledo. A building has been leased and the plant will soon be in operation.

The Retail Merchants' Association, of Nashville, Tenn., has sent a committee to Chicago to appear before the board of directors of the American Skein & Foundry Co. to endeavor to induce them to establish a plant at Nashville.

The Denning Fence Works, Cedar Rapids, Ia., have been succeeded by the Denning Wire & Fence Co., incorporated with a capital of $500,000. The change in name and increase in capital are merely to facilitate the taking care of increasing business.

The blast furnace and wood alcohol plant of the Ashland Iron & Steel Co., Ashland, Wis., which has been closed for two months to make repairs, has resumed operations.

W. P. Hammond will establish a machine shop at Marysville, Cal. Mr. Hammond owns and operates a number of gold dredges on the Yuba river.

The Volunteer Disc Plow Co., of Chattanooga, Tenn., recently organized with a capital of $50,000, will probably not erect a plant, as it has made arrangements with the Chattanooga Implement & Mfg. Co. to have that concern manufacture its patent disc plows.

The bids for erecting the steel superstructure of the Boston approach viaduct and seven fixed spans of Atlantic avenue bridge over the railroad yard of the Boston Terminal and Fort Point Channel were opened a few days ago. There were ten bidders and the bids ranged from $129,950, presented by the American Bridge Co., to the Pennsylvania Steel Co.'s bid of $89,100. The bids were taken under consideration.

James B. Williams, president of the Automatic Scale Co., of Minden, La., is in Kalamazoo, Mich., arranging for the manufacture in that city of a universal automatic weighing baggage machine invented by himself.

The outlook for the early reopening of the Columbia Iron Works, of St. Clair, Mich., is much more favorable than it has been for some time. The company proposed to settle with its creditors at 20 cents on the dollar, and the majority of them have accepted the offer. The liabilities of the company amount to $460,380, while the plant and material on hand, which are the only tangible assets, have been valued at $220,929, upon which there are liens of $84,136.

The Meisel Mfg. Co., Port Huron, Mich., has made a second shipment of flour mill machinery to Yokohama, Japan. This company is now very busy and is making many shipments to points in the United States.

The reorganization of the Vance Boiler Works, LeRoy, N. Y., was consummated last week, when the board of directors elected the following officers: President and treasurer, Bernard Borgman; vice president, James R. Vance; secretary, Thomas H. Sweeney. The plant will resume operations under favorable conditions.

The United States Steel Products Co. is figuring on a large contract for rails to be used in the construction of the new railroad system to be built by the Chilean government. M. Varella, who is now at the office of El Americano, 90-96 Wall street, New York, will make arrangements for the purchase of various railroad material, which will represent an expenditure of at least $5,000,000.

At South Sharon, Pa., the Carnegie Steel Co. this week fired two additional open-hearth furnaces, making eight out of the twelve operative. The blooming mill was placed on double turn, as single turn operations did not produce sufficient steel to supply the demands of the mills of the American Steel & Wire Co. During a twelve-hour run last week, the blooming mill turned out 658 tons of steel, breaking the best previous record of 614 tons.

The light rail department of the Edgar Thomson Steel Works, of the Carnegie Steel Co., Braddock, Pa., was started up this week after a brief idleness. The Howard Axle Works of this company at Homestead was also placed on in full this week for the first time in many months.

The tin house of the sheet and tin plate plant of the Follansbee Bros. Co., Pittsburg, located at Mahon Station, W. Va., was put in operation this week. This plant is now operating in full, and a large tonnage is being turned out daily.

It is now announced that the tube mills of the National Tube Co., Pittsburg, located at Lorain, O., will be put in operation shortly after the first of the year. Both blast furnaces will soon be started. The installation of machinery is progressing favorably and there is little doubt but that everything will be in shape to begin operations in January.

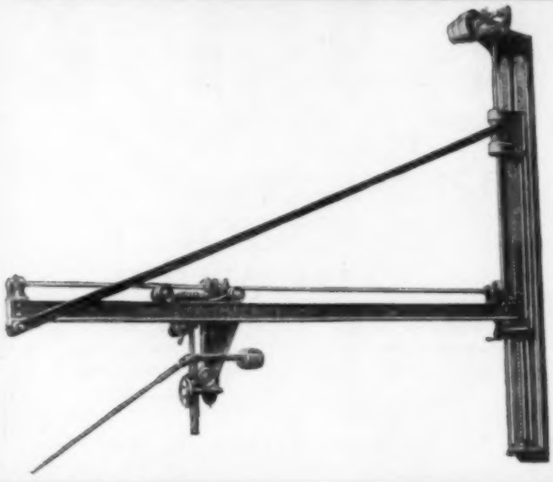
It is probable that the steel mill of the Carnegie Steel Co., Mingo Junction, O., will continue idle until the first of the year. The plant has operated only three months this year, and the two blast furnaces have not done much better. At present only one stack is in operation.

## COCHRANE HEATERS Reduce Coal Bills

One of the first things that should be considered by the engineer who is trying to put his steam plant on a more economical basis is the temperature of the feed water going into his boilers. If this temperature is under 200° F., and if there is exhaust steam available for heating the water, a distinct saving can be made in the fuel bills by installing a Cochrane Feed Water Heater. Every 10° added to the temperature of the feed water takes off more than 1 per cent. of the coal bill, and the total saving often amounts to 15 per cent. or more—seldom less than five per cent. The value of such a saving is so great that it is worth your while to find out exactly what the temperature of your feed water is. Do not depend upon guess work, nor upon the feel of the feed pipe, because if the water has a temperature of 150° the pipe will be too hot for you to keep your hand on it, and may mislead you into thinking that you are obtaining the maximum temperature. Put a thermometer right in the pipe and see what the real temperature is. As like as not you will find that by installing a Cochrane Heater, and using your exhaust steam to heat the water, you will be able to make a coal saving that will pay for the installation in a few months. If you desire to investigate more fully the possibilities of these Cochrane Heaters, send for our **Catalogue 11-H** which describes and illustrates them, and which contains much information of value to the man who owns or operates a steam plant.

**HARRISON SAFETY BOILER WORKS, Clearfield and 17th Sts., Philadelphia, Pa.**

**Manufacturers also of Cochrane Steam and Oil Separators and of the Sorge-Cochrane System.**



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PUNCHES AND DIES, ANY AND ALL STANDARDS

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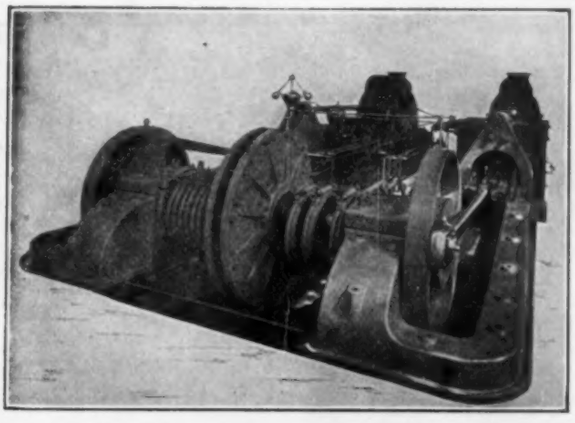

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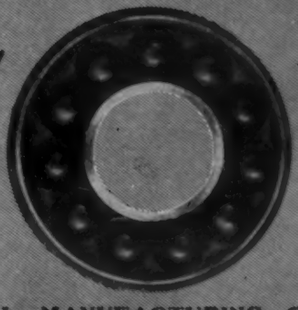
## STEEL BALLS



The test of quality lies in service. The best balls are known as "High Duty." We make them.

Something more than a micrometer is needed to distinguish good balls from bad ones.

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Producing wire
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## Clay Working Tools

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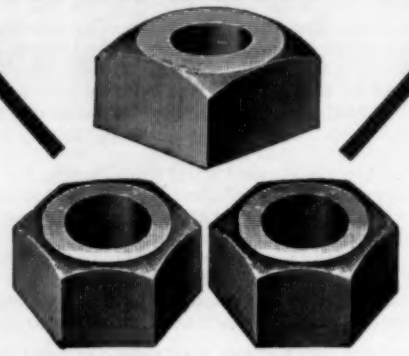

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We have just found a quantity of these at one of our Plants, and while they bear the name of the American Sheet Steel Company, and are, therefore, a little out of date as to the name of our company, the information they contain is as valuable as ever and will be of great help to any person who uses Galvanized Sheets.

The "APOLLO" Weight Cards not only tell the size, gauge, weight and number of sheets per bundle, but also the number of square feet in all the various sized sheets.

The Apollo Best Bloom Galvanized Sheets and the Apollo Weight Cards are much alike; they both save the user lots of time, money, worry and guess work.

If you can use an Apollo Weight Card, clip off the corner of this ad, fill it out and send to W. C. Cronemeyer, Advertising Agent, 222 Frick Building, Pittsburgh, Pa., and one will be sent by return mail.

*W. C. Cronemeyer, Adv. Agt.*
*Dear Sir:*
*Kindly send me one of your*
*"APOLLO Best Bloom" Weight Cards.*
*Yours very truly,*
.....*Name*
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**American Sheet & Tin Plate Co.**
FRICK BUILDING, PITTSBURGH, PA.